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BOSTON STEAMSHIP CO.—AN IMPORTANT CONCERN.

The question of transporting supplies to the Philippines is the cause of an interesting controversy in Washington at present. Bids were recently solicited by the war department for this service and the only bidder was the Boston Steamship Co. The war department was not especially well informed regarding this company but inquiry resulted in the discovery that it is a competent and influential company. It was organized by Kidder, Peabody & Co., Boston bankers, and has constructed within the past three years the following vessels at the works of the Maryland Steel Co., Sparrow's Point, Md.: Shawmut, 9,000 tons; Tremont, 9,000 tons; Pleiades, 3,970 tons; Hyades 3,970 tons. The company is closely affiliated with the Great Northern railway, and the two Great Northern liners, now building at New London, Conn., and which it appears are to be named Minnesota and Montana, are to operate in conjunction with them. The rate offered the war department on freight is about 45 cents per hundredweight from Seattle to Manila, $25 per head for soldiers without subsistence, $35 with subsistence, and $100 for officers and civilians traveling first class. It is contended that no other combination can afford to make a lower rate and it is proved that the war department will save money by accepting it—that is that it is lower than the aggregate sum they are now paying works out. It was a great surprise that no other railways or steamship lines bid on this service when proposals were invited. However, they have now awakened to the situation and are wiring the war department and sending representatives to Washington to insist upon another chance. The Boston Steamship Co., however, has the New England delegation of senators and representatives back of it, who are insisting that the company's bid, offered in good faith, be accepted and a few hints have been dropped to the quartermaster's department that it must stop its opposition to the acceptance of the bid or invite investigation into its conduct. Mr. James J. Hill is at present in Washington looking after the Great Northern's end of the case.

MR. BERNARD N. BAKER RETIRES FROM BUSINESS.

Mr. Bernard N. Baker, who by virtue of the formation of the International Mercantile Marine Co., has retired as president of the Atlantic Transport Co., will also sever his connection with the Baker-Whiteley Coal Co. of which he is president. The old pier of the Baker-Whiteley company at Baltimore, will be torn down to provide more room for the vessels of the Atlantic Transport Co. Mr. Baker was born in Baltimore, May 11, 1854, and his first business venture was made in August, 1874, when he started a chemical company. In the fall of the same year he established the coal firm of Baker, Whiteley & Co. Mr. Baker brought the first soft coal over the Pennsylvania railroad from the Clearfield region into Baltimore.

In settling with the stockholders of the Atlantic Transport Co., after its absorption by the International Mercantile Marine Co., Mr. Baker reserved enough to make substantial offerings to the heads of departments, clerical force and other employes. These gifts are now being distributed by Mr. Baker in the shape of securities of the new combine. To the employes whose services are to be retained by the International Mercantile Marine is given an equivalent of one year's salary and to those whose services are to be dispensed with an equivalent of two years' salary.

"The boys stood by me in both bad and good times and always treated me kindly and with respect," said Mr. Baker. "Now I want them to feel that I appreciate it and that if they lose their positions they will have something to keep them from want until they secure other places. Many of them have been with me since the company was formed and have worked faithfully. There are about 225 employes located at Baltimore, Philadelphia, New York, Boston, Minneapolis and other points, most of them being in Baltimore, and about one-third of them will lose their situations. You know the object of consolidation is to reduce expenses. I put through the deal for the sale to the combined company as the representative of the 150 or so stockholders, and the settlement was made with me. When I settled with the stockholders I reserved enough to make a gift to the boys for their good service. The cash valuation of the securities distributed among the employes aggregates about $350,000. Stock is now being issued to them as fast as it can be made out and in denominations of their choice."

The cruiser Philadelphia is to be converted into a training ship at the Puget Sound navy yard. It would have cost about $500,000 to remodel the cruiser and bring her up to date, and the department thought it best to make a training ship of her and spend the money on a new ship.

SUBMARINE AN ADJUNCT TO A WARSHIP.

Mr. Geo. W. Dickie of the Union Iron Works, San Francisco, did not attend the recent meeting of the Society of Naval Architects and Marine Engineers in New York and some of the papers were of course a little late in reaching him on the Pacific coast. He has just forwarded to Secretary Capps for incorporation in the transactions of the society a brief discussion of Mr. Lawrence Y. Spear's paper on "Submarine Torpedo Boats—Past, Present and Future," and has favored the Review with a copy of it, which follows:

"I have read with pleasure Mr. Spear's interesting paper, and while rather disappointed that, for obvious business reasons, he found it necessary to exclude the consideration or description of details from his paper, and thus making a discussion of the merits of the Holland submarine boat as compared with others impossible, yet his general comparisons of the various types of this class of boat, and his condensed history of their development, must be very interesting to those who either from choice or business necessity desire to know all they can about such instruments of naval warfare. I believe that if the submarine boat is to develop into an important branch of the naval service, it will not be as a means of doing away with the warship, but as an instrument that the warship can use as an effective weapon of offense. I have for some time been of the opinion that the proper place for the submarine boat is inside of the warship, and that it should always be a submarine boat; that is, it need not necessarily ever come to the surface. My idea of size would be about 40 ft. long and 8 ft. diameter, propelled by an electric motor operated from a storage battery, the torpedo being similar to that now fitted to submarine boats. In a warship carrying such a boat I would construct a transverse tube, say 10 ft. diameter, with watertight gates on each side, the upper part of the tube being, say about 5 ft. under the water line at normal trim. The submarine boat would enter this tube, the gates would be closed, and the water pumped out; then the watertight hatch in the submarine boat could be opened opposite a hatch in the tube, for the crew of say four or five men to come on deck. The battery on the submarine boat would be charged from the ship's generators, and need not exceed two hours' full power capacity. The air accumulator would also be charged from a compressor on board ship. To send such a submarine boat out on its mission of destruction, the crew would take their places on board, the hatch in the boat would be closed, the hatch in the tube would also be closed, water turned into the tube, the gate on the side next the enemy opened, start the motor, and she is off. Such a boat should have a little surplus buoyancy, and be submerged by horizontal rudders, as in the present submarines. Telegraphic communication could always be maintained with the parent ship, and instructions could be given to the crew at all times.

No conning tower would be necessary on such a boat, as she would start out within sight of the enemy. A small sighting tube could be used without any part of the boat coming to the surface. This would be needed in finding the way back to her snug little harbor inside the parent ship. All this I think is the possible and natural development of the submarine boat. I have given all the details of what I have studied out in this direction, there being no obvious business reasons why I should not give the results of my study of the submarine boat. These studies, of course, have not dealt with either the past or present, but are what I think the future of the submarine boat is to be."

DEVICE FOR STOPPING VESSELS.

A test has been made at Montreal of a device to check the speed of vessels in an emergency, the invention of L. J. Lacoste, son of Chief Justice Sir Alex. Lacoste. The vessel's speed is checked by means of fins, controlled from the wheel house, which open at right angles to the vessel's side. The experiments were made with the government steamer Eureka, 103 ft. long, 22 ft. wide and of 200 tons capacity. The fins were 10 ft. long and 3½ ft. wide, made of ⅜-in. boiler plate. To hold the fins at right angles there are water cushions worked by rods and pistons from the fin. The cylinders in which the pistons work are four in number, each 13 in. long with 5 in. of water pressure, and when the boat was running 11 knots there was no jar when the apparatus was applied. By using one fin only a vessel may be swung upon her own axis. Under a speed of 8 miles an hour the Eureka was brought to a full stop in her own length when the fins only were used, and in half her length when her engines were reversed.

T. S. Marvel & Co., Newburg, N. Y., will lengthen the Sagamore, belonging to the Lake George Transportation Co., 20 ft.

THE NEW CUNARDERS.

Compared with other big liners—New British Cruisers—Scottish Ship Building Letter.

Glasgow, Dec. 1.—It is not the case, as some of the newspapers have stated, that the contracts for the new Cunarders have been placed. As a matter of fact, the Cunard Company has only now definitely and formally ask tenders from the principal ship building firms for the building of their two new Atlantic liners. When the directors meet the shareholders at an early date in order to make the necessary changes in the articles of association they will then be able to announce the firm or firms who will build the new vessels. The invitation to the builders lays down only a few details. The length of the vessel, the beam, the draught and the speed are the points of most general importance. On the length of 750 ft. and a beam of 76 ft., the designs prepared by the company indicate that sea speed of 25 knots can be obtained, upon a displacement which need not involve a greater draught than 32 ft. or 32 ft. 6 in. in sea-going trim. It is not so much a question of deep draught increaseing the power, because naval architects urge that it is a help to speed to have the screw propellers as far below the surface as possible. The limiting influence is rather the available depth of water in harbors.

The dimensions of the proposed Cunard ships are far ahead of any existing vessels. The 700-ft. ships of the White Star Line are the largest which go out of Great Britain, and often exceed 32 ft. draught. They have a beam 1 ft. short of that of the new Cunarders and are fuller in model, their displacement of between 28,000 and 30,000 tons being not much less than that of the new ships. But these White Star boats are not fast steamers, and for anything approaching to the new flyers one must look to the German fleet. To compare with the 750 ft. length and 76-ft. beam of the new ships, take the 706½ ft. by 72 ft. of the Kaiser Wilhelm II; the 684 ft. by 67 ft. of the Deutschland; the 663 ft by 66 ft. of the Kronprinz Wilhelm; the 648 ft. 7 in. by 66 ft. of the Kaiser Wilhelm der Grosse, all German ships. Then the 704 ft. by 68 ft. of the Oceanic, as well as the 622 ft. by 65 ft. 3 in. of the Campania and Lucania, upon which last the company propose to make an increase of 128 ft. or 25 per cent. in length, and an equally marked step in speed. The 25 knots to be got at sea will, it is anticipated, mean 26 knots at least on the measured mile in moderately still water. The builders being responsible for the realization of the sea speed will decide for the power necessary. It is considered that it will require to be about 50,000 to 58,000 I. H. P. The highest power placed in the German ships is 40,000 I. H. P. (in the new ship now building), to give 23½ to 24 knots; the Deutschland and Kronprinz Wilhelm have 36 I. H. P., and steamed on their best trip 23.53 knots; the Kaiser Wilhelm der Grosse has 30,000 I. H. P. for 22¾ knots; and the Campania and Lucania, the fastest of British boats, 28,000 I. H. P. for 22 knots. There will thus be a probable increase in the coal bill from about 20 to 40 tons per hour, as compared with the Campania and Lucania, for the addition of 3 sea miles per hour to the speed. It is probable that the vessels will be driven by three screws, instead of two. The power transmitted through each line of shafting will still be equal to the highest yet projected, which is about 18,000 to 19,000 I. H. P. in the case of the fast German ships.

The admiralty is now considering the tenders for a first-class armored cruiser of the new type. Instead of the guns of the secondary armament being placed within casemates they will be concentrated within a box battery formed by the side armor of 6 in. in thickness being carried in the central part of the ship in an unbroken broadside from under the waterline to the level of the upper deck, encasing the ship's side along the main deck, on which the guns are for the most part placed. The ends of the ship will also be armored on the waterline. The 6-in. guns, of which there will be ten equally divided between the two broadsides, will be separated from each other by armor partitions at the sides and rear. In addition to these quick-firers there will be six guns of 9.2-in. caliber, and these will be mounted singly in barbettes, one at each corner of the box battery, while near the bow and stern will be placed the fifth and sixth. In the larger British ships the 9.2-in. gun has always been a bow and stern chaser. The power of this caliber of gun has been much increased. In the County class, the 6-in gun is the most powerful, and this is regarded as objectionable. In the improved Counties a change was effected by fitting as bow and stern chasers the new and exceptionally powerful 7.5-in. weapon. The new cruisers now to be laid down are immensely superior. They are larger ships, although of less displacement than the Powerful or Drake. The displacement is to be 13,550 tons, as compared with the 14,200 tons and 14,100 tons of these two ships. The length is 480 ft., 20 ft, less than the great leviathans of the fleet; the beam is 73 ft. and it is anticipated that the draught will be about the same; between 26 ft. and 27 ft. They are to be fitted with engines of over 23,000 I. H. P., which will give them a speed of between 22¼ and 22½ knots, the rate of the Powerful and Terrible, but since exceeded by all the ships of the Drake class, whose machinery develops 30,000 I. H. P. One fifth of the boiler power will be on the cylindrical principle, and in one of the two new type ships, Howden's system will be applied, although it involves a slight addition to weight. There will be in each ship, six tank boilers, and twenty water-tube steam generators of the Babcock & Wilcox type, the collective area for steam raising being over 62,000 sq. ft. The steam pressure at the boilers will be 210 lbs., which is lower than in preceding ships, and the engine cylinders will be larger.

The English & American Shipping Co. have had built by C. S. Swan & Hunter Ltd., Wallsend, the screw steamer Dominion, just launched. The dimensions of this vessel are: Length over all, 360 ft.; breadth extreme, 47 ft.; depth, molded, 29 ft. 9 in. She has been specially designed for the owners' trade between Louisberg (Nova Scotia) and Boston, and for the quick loading and discharging of large cargoes of coal, of which she will carry 6,000 tons. Triple-expansion engines are being fitted by the Wallsend Slipway & Engineering Co., Ltd. The vessel has been built to take the highest class of the British Corporation for the Survey and Registry of Shipping.

THOMAS B. REED.

"Distributing for years the patronage of his sovereign, he lived without ostentation and he died poor." This is the epitaph which the English have inscribed on the tombstone of Chatham (William Pitt, the elder). We do not know how simplicity and honesty could be better described. In an age which was corrupt and in a position which afforded unexampled opportunities for its employment, he remained honest. A worthier epitaph could not be dedicated to any man. Much the same thing could be said of Thomas B. Reed, who died on Saturday evening last at Washington, the scene of all his triumphs. Possibly there will be few who will take issue with the statement that Tom Reed was the biggest man in the Republican party. While he had no patience with details in the grasp of principles he was lucidity itself. While he was speaker of the house he was the most powerful man in the country, greater even than the president, for he dominated legislation absolutely. No man ever had a legislative body in better control. So complete was his sway over it that he could, by the sheer force of mind, aided by a perfect mastery of parliamentary rules and bitter and merciless satire, beat it into abject submission. The Democratic minority was constantly cowed by him. Whenever one of them crossed swords with Reed the weapon was sent flying out of his hands instantly. There was no doubt about it—intellectually Reed was superior to any man over whom he presided. His chief fame in the popular mind was his enforcement of the quorum rule. In the contest for the speakership at this time he vanquished McKinley. The men were as opposite as the poles in temperament. Had there been no issue such as the enforcement of these rules it is likely that McKinley would have been elected speaker, for he possessed an ingratiating personality and was far more popular. But it was recognized, even by his friends, that he would never do for such a contest as this. He probably would not have been able to enforce rules which created such a storm of bitterness and made so many mortal enemies. But Reed enforced them inflexibly, not caring what precedents were broken or who was hurt. He literally crammed the rules down the throat of congress. And very good rules they are indeed. They were revolutionary but efficient. They have facilitated business immensely. No one objects to them now, though congress is operating today under Reed rules. The Reed rules established the authority of the majority. When Reed resigned in 1899 he was the first man in the country. So long as he remained at the head of the house no piece of legislation to which he was opposed could possibly pass. He was not friendly to the administration. He was in position to forestall any move the White House might make to which he was hostile. Power is sweet to any man, and yet at this juncture Tom Reed resigned. The cause of his resignation is his principal monument. He resigned in order that he might make money. He surrendered the foremost office, next to the presidency in any event and beyond it under his dominion, that he might earn money for his family. A life time was spent in congress; and at sixty we see this man stepping down in order to adequately provide for his wife and daughter. No man was loved more or hated more than Reed. His honesty, integrity and loyalty won him friends; his vituperative tongue enemies. Reed never minced words. Thin skins were constantly scorched by him. When a certain member wanted a place on the committee on rivers and harbors Reed blurted out: "How much of a steal are you after?" When J. Hamilton Lewis got on his feet and Reed recognized him by saying "The gentleman from Oregon," Lewis corrected him saying, "Washington, Mr. Speaker." Reed instantly replied: "I beg Oregon's pardon." When he was asked his opinion of the Sampson-Schley controversy he drawled: "I don't see what the row between these two naval heroes is about. As far as I can see one of them wasn't in the fight at all and the other was doing his damndest to get out of it." No man with a tongue like that is universally loved.

Mr. Lewis Nixon, president of the United States Ship Building Co., visited the Bath Iron Works last week. He told the people of Bath that the Bath plant would be kept busy on the work which it is especially adapted to do.

NAVY AS AN OPENING FOR YOUNG MEN.

Under the title "Careers for the Coming Men," the New York Tribune has opened a series of practical and authoritative discussions of the professions and callings open to young men. The paper in the current Sunday issue is of especial interest to readers of the Review, as it deals with the navy and is from the pen of Rear Admiral George Wallace Melville. Admiral Melville says:

"Whatever else resulted from the Spanish-American war, it is certain that it brought the navy in fuller knowledge and closer touch with the mass of our people. As the work and purpose of the organization have been more carefully studied, it becomes evident that either by force of circumstances or by manifest destiny the navy must eventually become the strong arm of national defence.

"It is highly probable, therefore, that in the early future a representative from every village and hamlet will be found either on the forecastle or quarterdeck of one of the war vessels that carry the national standard. It thus becomes of direct interest to hundreds of thousands of persons, who are directly or indirectly connected with the service, to know something of the possibilities that are offered by a career in the navy. It is also of national import that those who are taxed for its maintenance, who glory in its triumphs, and who suffer in the defeats of a navy, should be made acquainted with the traditions, inspirations and encouragements that prompt men to choose a calling which often entails the sacrifice of home, and which may even demand life for flag and for country.

"The navy is a paradox. There is within it the pride, culture, loyalty and imperiousness of an aristocracy, and yet the love of the commander for his crew and the affection of the sailors for their officers are representative of the ideal democracy. The whole trend of the naval life is to cultivate strong friendships, induce men to be fearless in the discharge of duty, demand efficiency upon the part of the individual and honor the unassuming. There is an indefinable power in a lifework at sea that tends to bring out the best in the man. The sea in its fury, and even at times in its calm, has a tendency to make all men feel their nothingness, and it is not surprising that where men in common have shared triumphs, endured perils, seen the wonders of the deep and have even at times felt the presence of a stronger power, they become bound by a tie that often causes shipmates to be loved even closer than a brother.

"The nature of the work of every navy compels its standard and methods to be compared with those of other services, and therefore efficiency and integrity prevail. But there is extreme conservatism also, and it is amazing how tenaciously the sailors strive to adapt the traditions and customs of the wooden brigs of the sailing period to the battleship of the steam age. And yet there is something that appeals to the best that is within men in the effort of the sailor to preserve the traditions of the sailing age—an age of romance, for there was excitement in the taking in of a topsail that is missing in the mechanical labor of operating a motor or running a winch.

"In seeking a career in the navy one therefore finds opposing him the conservative social at the same time he is impressed by the simplicity, efficiency and high character of his professional superiors. The work of the navy differs from that of all other callings by reason of the fact that mediocrity in results cannot be endured. The shot that does not hit does not count. The engine that cannot be forced to secure all that it was designed to do may prevent the warship from performing the mission upon which she was sent. The officers who do not within themselves show a good example of efficiency and partriotism are not fit representatives of their country in foreign harbors. The commander of a vessel or of a fleet who cannot in time of emergency show that he possesses rare diplomatic ability lacks one of the primary elements of a naval leader.

"Whether the country be at peace or at war, the highest discipline and the best efficiency must be maintained, and it is for this reason that the navy cannot rest content with commonplace work. It does not require a war to bring any naval weakness to the attention of the country. As it is expected that the ships will go to sea, and be sent to distant harbors where there are neither repair facilities nor reserve of supplies, self-preservation compels all hands to see that efficiency is maintained, and this is why the strongest and best navies can be made ready for service at short notice.

"The latest type of American battleship, when ready for commissioning, will represent a greater actual cost than the beautiful Congressional Library erected in the city of Washington. In all probability if an emergency order was given in both cases, the library could be completed sooner than the battleship, and the depreciation of the ship will be several times as great as that of the building. It is because depreciation must be prevented and efficiency maintained that there must be assigned to every modern warship a large complement of highly trained and educated officers, as well as a skilled and resourceful crew. The number of officers of high rank in the navy must therefore necessarily be great. There must likewise be among the enlisted force a very large percentage of men who receive high pay, and who are accorded respect and consideration. In all probability the average pay of those on board a warship is over double that received by troops in barracks or in camp. The opportunity for professional advancement is also very much greater on shipboard than on shore. The man who possesses technical skill, application of purpose and power of resource, whether he be an enlisted man or an officer, will have an opportunity during the three years' cruise in home or foreign waters of steadily improving himself. It is the certainty of quick promotion for the officer, good pay for the men, and opportunity for both of securing increased knwledge, as well as loyalty to the flag, that should make the navy a career that should be sought by tens of thousands of young men who know nothing about the service.

"In analyzing the advantages and inducements that should influence many young men to spend several years in the navy, it may be best to tell first what is offered to the enlisted force. The first thing a recruit learns upon joining a naval vessel is the necessity of implicit obedience. It is an old saying that 'the captain of a warship is an absolute despot,' and if any commander cares to exercise the power that is vested in him this epigram practically expresses the truth. The traditions of the service, however, as well as sound judgment and self-interest upon the part of the commander, seldom tempt him to exercise such a prerogative. The enlisted man who tries to do his duty, therefore, suffers very little from the yoke of discipline. In fact, it is a protection to the man well disposed to do his duty, since severe measures are only taken against those who are inclined to disobey the rules and regulations that have been found necessary on board a ship where men are crowded together.

"If it be true that cleanliness is next to Godliness, then thousands of recruits in the naval service are benefitted by what they witness on board ships as respects cultivating the habit of being neat and attractive in person. From truck to keel and from stem to stern, some one is held responsible for the cleanliness and good order of every compartment and tool within the vessel. It is due to this fact that the health of the crew of a warship is so good. The clothing is frequently and carefully inspected, and that man is regarded as a disgrace to the ship and to the naval service who is not interested in keeping his clothing, the vessel and himself exceedingly clean. This may seem an unimportant matter to some persons, but I believe that the good resulting from the effectiveness with which cleanliness is impressed upon man-of-warsmen cannot be overestimated.

Then there is a certainty of promotion and increase of pay that must be taken into account. The demand for leading petty officers is so urgent in the naval service that practically all the commanding officers are willing to give men advancement every six months, and in some cases promotion is accorded at shorter intervals. Some of the warrant machinists now in the navy, receiving $1,500 per annum, secured this promotion in less than two years from the time they enlisted in the naval service, and this is evidence that the officers of the navy are exceedingly desirous of rewarding specially deserving men.

"Two years ago the congress of the United States passed a law whereby any boatswain, gunner or machinist, who has been six years a warrant officer and who could pass the examination prescribed by the department, could secure a commission in the naval service. Several gunners have already been commissioned ensigns in accordance with the operation of the act and an extension of the opportunity to secure a commission will be accorded to the enlisted force if the men who are promoted to such rank should show by their conduct and duty that it is advisable further to recruit part of the commissioned personnel from this source. The opportunity therefore presents itself for any apprentice boy eventually to command a fleet. The advantages accruing from the opportunity of visiting foreign ports and of observing foreign methods and customs cannot be measured. Such opportunities come to the enlisted force, and it is their own fault in most cases if the men do not secure valuable information from this great privilege.

"Considering the opportunities an enlisted man in the navy has for acquiring increased technical skill, noting foreign methods, securing advancement in pay and place, and of developing manhood and character, I unhesitatingly recommend young men to seek a career in the navy, even though a commission may not await them. The man-of-war'sman of today is quite a different character from the counterpart of a century ago. It is no longer good form even on the forecastle to return drunk from liberty and to swear like a trooper. In fact, the complaint rather comes that the dress suit is taking up space that should be used for rain clothes, and that the laundry list of the men is approaching that of the officers. Whatever else such facts show, it is proof positive that there is an atmosphere of culture and refinement on the berthdeck that never existed before. This makes for an efficient navy, because the naval conflicts of the future will be short, sharp and decisive, and men of intelligence and resource, rather than of brawn, are needed on the forecastle as well as in the cabin and wardroom.

"It will certainly count for the happiness and self-esteem of a man in the retrospection of old age that he gave some, if not all, the best years of his life to the service of his country. Even the crown prince of the German empire is compelled to perform some military or naval service, and when the accession to the throne comes there is not one of these reigning monarchs who does not proudly refer to the military service that he performed as a youth. The man who could not refer with pride to such

service in the navy is lacking in some attribute that makes up the patriot, and an injustice is not done him in asserting that he is almost without manhood and self-respect.

"As the navy offers much to the enlisted man, it ought and does offer more to those who have been honored by receiving a commission in the service. Such a commission may open the doors of the homes of the gentle, cultured and refined, and ought to secure the esteem of those who are leaders in the industrial, social and literary world. It insures an income sufficient for necessary expenditures. While the pay of the naval officer is in many respects inadequate, considering the expenses to which he is subjected, yet it permits an officer by economy to live in a manner fitting his rank and position. A career in the navy gives every officer who possesses application an opportunity to specialize along particular lines. The opportunity also presents itself for such an officer by travel and observation to acquaint himself with the strength and weakness of other nations; to acquire their language, to read their best literature and to note the great works that have been wrought by the master minds of those countries. Service in the navy does not unfit either the enlisted man or the commissioned officer for a business career. Probably the best answer to the question as to whether or not the navy trains men for a future career can be given by noting the success of the thousands of business and professional men now in civil life who once mustered on the quarterdeck of some man-of-war.

"A great change has been wrought in the navy during the last twenty years, and therefore the new navy offers quite a different career from what presented itself in the past. Gone are the seas of snowy canvas which propelled the old ships of the line amid the long and heavy billows of the several oceans; gone are the clewlines and buntlines, the halyards and braces, the tacks and sheets and the endless mass of rigging that was such a delight to the sailor of the previous generation; gone is the inspiration that came to the royal yardman as he clambered aloft in a stiff breeze or gale; gone in great part is the romance of the sea, for the weather gauge of the enemy is now secured through the skill and endurance of the fireman rather than by the handiness and readiness of the seaman.

"The strenuous life now prevails on shipboard as well as on shore, and the seamen of the new navy, in operating the countless mechanical appliances that are installed on shipboard, is as useful as his counterpart whose principal work was above rather than below the main deck. The sailor of the new generation must keep all his senses on the alert; his ear must be trained to detect any variation in the rythmic beat of the pistons and propellers; his eye must note any leakage of water or of vapor or any change in conditions; his touch must be sensitive to the temperature of the working parts, and even his tongue must be a monitor in helping to maintain the freshness of the water in the boilers. But above all he must have that high courage which does not demand the plaudits of his comrades or the sight of the flag to nerve him to do his best work.

"Although the sails have passed away and the new conditions have come to stay, there are those who attempt to resist the inexorable tendency of affairs. This conservatism would adapt the organization of the ships of oak to the new vessels of steel. The old organization went with the old ships, and, in the words of President Roosevelt, 'the naval officer of the future must be a fighting engineer.' And therefore a career in the new navy, for the great majority of those who are connected with the service, must be along mechanical lines. It is not an easy task to bring this development so rapidly about, for in some quarters it was regarded as a revolution rather than progression. It has always been a hard battle to overcome the traditions and prejudices of the past. In years past there has been no policy pursued in the development of the navy, and therefore the inducements for seeking a naval life as a career have not been so great as now presented. At times the navy has been petted and coddled, and then, again, it has been neglected and assailed. It is possible that there have been controlling forces which have made the service so exclusive that its work and purpose have never been understood by even the congress.

"In the words of another: 'Its highest possibilities will be reached when it recognizes the fact that no coterie, or class, or clique, should dominate except so far as it has won the right by sheer merit and by that unselfishness of which for all time the great admirals have been models of undying memory.' And this unselfishness must recognize the brotherhood in arms, both in time of peace and in the stress of battle, of all who serve on the vessel, whether their duties relate to rationing or clothing the men, comforting the sick, maintaining discipline, operating the motive power or fighting the gun. That navy only is worthy of the affection, love and support of the people which offers a career to every man responsible even in part for the efficiency of the ship. As the navy offers much, it expects much. From time immemorial it has been regarded as a privilege to be intrusted with the duty of guarding the liberty of the republic and sustaining the honor of the flag. And therefore the country believes that a career in the navy is representative of efficiency, integrity and manhood, and that those who serve their country well on the high seas are entitled to the rewards and emoluments that should go with duty conscientiously performed."

INSURANCE OF SHIPS AT LLOYD'S.

By Lawrence Irwell.

The story of Lloyd's coffee house has been so often told in connection with the history of the greatest of all insurance organizations that I will deal with it very briefly—as an introduction to some other matters bearing upon the insurance of ships that may prove interesting, if not particularly new, in a publication like the Marine Review. As Great Britain is the chief owner of sea-going ships, the greater part of the marine insurance of the world is arranged and the premiums paid in that country. Coffee houses in London were once the merchants' places of resort for the transaction of business. Edward Lloyd kept a coffee house on Tower street—removed to Lombard street in 1692—which was frequented by owners of ships and cargo, and by merchants who were prepared to write their names under an agreement promising to pay the amount specified thereon should any casualty occur. In this way has arisen the designation underwriter, as applied to the insurance of ships and freights. Evidently Lloyd's coffee house became a center of intelligence for the shipping industry, and in 1696 the proprietor bought out a paper, called *Lloyd's News,* for the information of his patrons. The journal came under the ban of the government, and soon ceased to exist. Thirty years later *Lloyd's List* was issued; and in 1784 it was amalgamated with the *Shipping* and *Mercantile Gazette.* As a coffee house was open to all, privacy was almost impossible. Speculative underwriting now became so marked a feature at Lloyd's as to necessitate some system of business more in keeping with strictly mercantile habits. In addition, the commercial community began to frown upon gambling of the most barefaced character, sheltered under the cloak of underwriting. To remedy the various evils which existed, a society was formed for the purpose of excluding such frequenters of Lloyd's coffee house as were not business men, and in 1770 the establishment was moved to Pope's Head alley. The need was now felt for premises to be used exclusively for the transaction of marine insurance, where the procedure of underwriting could be regulated, and where the necessary information could be furnished to members with regard to the hulls of ships, etc., etc. Twenty-nine underwriters having guaranteed £100 each to insure the construction of a new building suitable for the requirements of the business, the members of Lloyd's took up offices on the first floor of the Royal Exchange in 1774, and an annual subscription was made compulsory. At the same time highly necessary steps were taken to suppress the flagrant speculative underwriting then prevailing. In 1870, Lloyd's was incorporated by a statute of Great Britain; and it is still, without doubt, the most important center of shipping intelligence in the world, with an agent at every place of commercial importance. It now consists of 600 underwriting members, 150 non-underwriting members, and 470 annual members, with a premium income of £3,000,000 per annum. Every underwriting member must deposit £5,000 which cannot be attached or used except in satisfaction of purely marine insurance policies. The investments held by the committee of Lloyd's on behalf of members amount to about £4,000,000. Marine insurance, even in England, is not, of course, confined strictly to Lloyd's. There are now in London other bodies of merchants engaged in the same business, and as a result competition is very keen. Edward Lloyd "passed away" many years ago, but his name still survives and will probably be in use as long as marine insurance exists. The name of Lloyd has been adopted by commercial corporations in the insurance business in the United States and elsewhere.

Some of the great shipping companies, such as the White Star Line, act as their own underwriters. In other words, they have sufficient capital and a sufficient income to lay aside a reserve for a day of misfortune. A few other firms take a certain proportion of the risk on their ships. As a rule, however, owners of ships find it less troublesome to insure their property to its full value at Lloyd's or elsewhere.

It is necessary in these days of big ships and costly cargoes to spread the risk as far as possible over a number of underwriters. Vessels range in value up to about $2,500,000. The freight may be worth as much as four times that amount, for a valuable cargo is not necessarily bulky. Indeed, $1,250,000 worth of silk worm's eggs alone have been shipped on one steamer from China. The underwriter's aim is, of course, to make money. In order to do this, he must take every care to fit his premiums to the risk. The class of ship, the character of the trade in which she is engaged, the route she will probably take, the standing of her owners have all to be taken into account. A giant book published from Lloyd's affords all information of any importance as to every ship's history, and when an owner wishes to effect an insurance on a ship, he instructs a broker to attend to the necessary formalities. The latter fills out a form, and presents this to an underwriter for approval. Having made an estimate of the nature of the investment, the underwriter determines the premium which the ship owner must pay. This may be anything short of a rate per cent. sufficiently high to prove prohibitive. Each underwriter writes upon the form the exact amount he is prepared to become responsible for and puts his initials against it. If, for example, the sum of £5,000 is required and ten underwriters take a risk of £500 each, a policy is prepared stating all essential facts, and all ten underwriters sign it. In case of loss or casualty insured against, the underwriters pay, after sufficient proofs have been presented, the same as in any other insurance

business. Why the intervention of a broker is necessary, has not been properly explained. The most probable reason is that it is a custom of long standing, and old customs "die hard" in England. Of course the broker is not necessary in all cases. Large insurance companies do an immense amount of business in which the brokers do not figure at all.

Competition amongst underwriters prevents premiums from becoming extravagantly high, and at the same time it compels the acceptance of risks which might be objected to if there were an insurance trust. In underwriting, as in other matters, the great teacher is experience. Certain ships in the tea trade with China brought so many claims on the members of Lloyd's that they eventually became practically uninsurable. On the other hand, experience was wanting as regards iron and steel ships when they were first introduced, and insurances upon them were difficult to place. Once their strength and durability were known, the tide turned. As has already been mentioned, underwriters seldom object to paying what they have agreed to pay, provided satisfactory proof of liability is produced. A loss may seem open to objection, but grumbling would injure business. Experience, even when bought by a financial loss, aids in the avoidance of a similar risk in the future. If shipping casualties were unknown, then the underwriters occupation would be gone. A few losses really assist the great body of underwriters, because they make evident the necessity for insurance.

The premium charged by any underwriter varies to a large extent with the reputation enjoyed by the firm to which a ship belongs. This is one of the first considerations following the seaworthiness of the ship. An Atlantic liner, for example, is insured for twelve months at from £4 to £5 per cent., whereas, a "tramp" may have to pay from £7 to £10 per cent. Freight of all kinds is differentiated in the same way. Goods that are insured for about $1.50 per cent. when on a steamer belonging to a first-class line have to pay from double that amount in summer to four times the sum in winter if carried on a "tramp." Inasmuch as these steamers, whether liners or "tramps," were built to the highest class, the cause for this difference in rates is not to be found in the original construction of the ship, but rather in the reputation of the owners, the captains, the route—and possibly the age of vessel. Moreover, underwriters have fewer claims from ships engaged in regular trades, managed by firms of long standing in the commercial world, than they have from vessels of much the same size and type trading from New York to England on one voyage, from England to India on another, and owned by a large number of small stockholders, the manager perhaps being a person unacquainted with ships and shipping.

Captains are always encouraged by underwriters to do their utmost when danger of loss is threatened. A skillful captain, ably backed by a competent crew, may save the underwriters many thousands of dollars. Some of the repairs carried out at sea are amazing. Meritorious actions on the part of captains are very seldom overlooked by underwriters. A couple of years since a four-masted sailing ship, the Liverpool, was almost swamped by a sea while running before a gale. Her charts, chronometers, and her nautical instruments were washed overboard. For some days her men were engaged in baling out water which had got into the hold through the smashed hatches. Fortunately, one small compass was saved when every other instrument was lost, and by the aid of this, with the use of the log, the captain brought the ship to within four days' sail of Calcutta (India). Then he obtained the exact geographical position from a Norwegian bark, and proceeded to his destination. The underwriters concerned subsequently presented him with a substantial sum of money. A well known steamship in the New Zealand trade, the Tokomaru, of the Shaw-Savill & Albion Line, broke her shaft when 500 miles from Rio Janeiro, on her way to England. After eight days and nights of incessant work, her crew succeeded in repairing the damage, and she returned to Rio under her own steam. Had the propeller fallen off while the men were at work in the confined space of the shaft tunnel, drowning was certain. The value at stake was $1,000,000. The assistance of other steamers which offered to tow the Tokomaru into port was declined, and the underwriters were thus saved a payment of at least $25,000 for salvage services. The captain and chief engineer were rewarded with presents of money, and $2,500 was divided between the other officers and crew.

Delay caused by quarantine is vexatious and expensive. Underwriters have, at various times, covered this risk at about $10 on each $500, on the understanding that in the event of a ship being thus detained they would pay $150 per day for a fixed number of days. Under the French tariff law, adopted in 1891, ships bound from Pacific ports of this country to France were a source of anxiety. A few hours even might make a difference of thousands of dollars to those interested in various kinds of goods. Many underwriters accepted the risk. In some cases they contracted to pay $450 on each $500 (£90 per cent.), and in other cases as though the ship were actually a total loss if she did not arrive before midnight on a specified day. This is unquestionably a form of gambling, but it is sometimes urged that all insurance—marine, life and fire—is of a speculative character as far as the underwriters are concerned. Such a risk as the one just referred to is probably an "honor" policy—one on which the person insuring must rely solely on the honor of the underwriter who accepts the risk, inasmuch as such a claim could not be enforced in a law court. Last year a person obtained an insurance of this description on a steamer, and the underwriter, after a claim had been made, refused to pay. The ship was to paid upon as a total loss in case she did not reach Japan on or before a certain date. The final result of the controversy was never made public, but the case did not come before a law court, and even if it had done so, the judge would not have allowed it to go to a jury.

Rumors of war have a marked influence upon the rates of premiums. When the so-called Fashoda incident (between Great Britain and France) was approaching a satisfactory settlement the rate of insurance against risk of war dropped from £25 per cent. to £10—that is from $125 on $500 to $50. The war between this country and Spain made business brisk for the insurers of ships, all of whom refused to pay on the steamship Restormel, captured by the St. Paul, and afterwards released by the prize court. She was insured for $75,000 against total loss, and her owners abandoned her to the underwriters, who declined to carry out their contract on the ground that she was not a total loss, and also because the contraband nature of her cargo had been concealed from them. A settlement was finally reached under which the underwriters paid $22,500 and some law costs.

Underwriting, whether done by an insurance company or by some institution like Lloyd's, is a business requiring a knowledge of ships, of human nature—and ordinary discretion. Small losses from minor frauds which could not be foreseen may occur in underwriting as in any other business. Almost all underwriters know the average time occupied by a ship in making a voyage between any two given ports. Should a vessel exceed this average, every cautious underwriter is sure to consider his position. He may re-insure at a slightly increased rate, or he may prefer to abide the result. If the time increases without the arrival of the vessel, the rate rises. Occasionally from 80 to 90 per cent. has to be paid for re-insurance, only to learn later of the safe arrival in port of the ship. After many days have elapsed without any news of a vessel, varying, of course, with the voyage on which she is engaged the ship is regarded as overdue. Some time later, no news of her having been received during the interval, she is posted at Lloyd's as missing, and the underwriters generally pay without a murmur.

Underwriters who accept exceptional risks are known at Lloyd's as "doctors." At times they have very exciting experiences. In 1897, sixteen vessels arrived at their destination on which £50 or more per cent. had been paid for re-insurance, three of them being sailing vessels. An American ship the T. F. Oakes, was 259 days making the passage from Hong Kong to New York, a voyage accomplished in 1895 by the Alcides in eighty-three days. Underwriters who paid £90 on each £100 insured to get rid of the risk on this vessel had the luck against them. Nevertheless, a comparison of the two ships' passages was sufficient to justify anxiety. The name of the T. F. Oakes was changed, but she became a total loss on her next voyage. The Mantauna, a British sailing ship, also afforded scope for speculation a few years ago. She took 225 days to sail from London to San Francisco, or about twice as long as the average passage. Eighty pounds per cent. was paid on her just prior to her arrival. Underwriters who took the trouble to study the career of this ship would have found her credited with several abnormally protracted voyages.

Taking the year 1898—the latest at hand—of the eighteen overdue ships which arrived after long delay, only three were steamers. One sailing vessel, the Ravenscrag, was absolutely uninsurable when she reached Callao (Peru) after a passage of 185 days from Puget Sound. Had another week passed without news of her, the underwriters would have paid the insurance, and she would have been posted as missing. Nevertheless, her voyage was almost equalled in 1886 by the Premier, a vessel that took 150 days to get from Puget Sound to Iquique (Chile). A few years since £93 per cent. was paid to insure the German bark Matadore, but she reached Valparaiso (Chile), after a voyage of 163 days from England. A similar vessel, the Henry, occupied 232 days between Corinto (Nicaragua) and Queenstown (Ireland). She happened to be spoken off Cape Horn at about the time she ought to have been entering Queenstown harbor, so that the fears of the underwriters were allayed, and the rate of re-insurance did not become very high. Underwriters sometimes forget two very important points which seriously influence the speed of ships, namely, that some kinds of cargo shift on very slight provocation and that an iron ship's bottom becomes covered with barnacles very quickly.

Insurance institutions perform a necessary function in the shipping world, but it must be admitted that competition has tended to lower the standard of the business, and reforms are necessary in this country as well as in Europe. The subject has not yet received the attention to which it is justly entitled. There might be great difficulties in the way of compelling an owner to take a specified share of the risk of loss of his ship, yet such a plan would have many advantages.

The monitor Florida, built at the Crescent ship yard, Elizabethport, N. J., had her preliminary trial this week and exceeded all expectations. The run was made up the Hudson as far as Tarrytown. The Florida attained a speed of 12 knots, 11½ knots being required of her. Naval Constructor Smith said he was never on a warship on its first trial which gave better satisfaction.

NEWS OF THE GREAT LAKES

HARBOR WORK ON LAKE ERIE.

Toledo, Dec. 10—A summary of the channel improvement work of the past season, here as well as at other near-by ports on Lake Erie, will probably prove of interest to readers of the Review. The United States dredge Maumee has been occupied in the Maumee river between the Cherry street and the Lake Shore bridges. The result of the season's work is a channel 400 ft. wide with a depth of upward of 21 ft. at mean level from the deep water below the Lake Shore railway bridge down to the lower end of the Lake Shore freight wharf at Monroe street; thence to the Cherry street bridge a channel 240 ft. wide with the same depth. Over this last section, for the balance of the 400 ft. width, the depths are now 18 to 20 ft. The balance of this section and the short section of river between the Craig ship yard and the Wheeling railway bridge are the only portions remaining to be dredged in order to accomplish 400 ft. width and a full depth of 21 ft. at mean level from the mouth of the river to the Lake Shore railway bridge. In the section between the Craig ship yard and the Wheeling railway bridge the natural depths are already nearly or quite 20 ft. over width of possibly 200 ft.

Work has been continued through the season by three dredges under contract with the Lydon & Drews Co. of Chicago. These dredges have completed the channel for full width and depth from the Wheeling railway bridge to the mouth of the river, straightening it so that there is but one bend, which is abreast of the Ironville wharves. A very heavy bank on the west side of the channel abreast of the Park and near the mouth of the river has been cut away, which will greatly facilitate the navigation of this portion of the river.

The Lydon & Drews Co. has also made decided progress upon the widening of the straight channel through Maumee bay. For a length of two miles outward from the mouth of the river this channel has been widened 100 ft. on the southerly side to a full depth of 21 ft. During next season it is likely that the other side of this channel will be widened from the mouth of the river to the bay lights. At present the straight channel through Maumee bay has the following depths and widths: From the mouth of the river two miles outward a width of 100 ft. northerly from the range and 200 ft. southerly from the range; for the next two miles to the bay lights, 200 ft. width; around the lights a turn-out on each side, 200 ft. width; from the lights to the lake, 200 ft. width. Through all these portions the depths are 21 ft. and upward at mean level. From the bay lights to the lake there is an additional width of 50 ft. on each side with depths of 16 to 19 ft.

The continuous contract of the Lydon & Drews Co. covers the removal of something like 6,500,000 cu. yds. from these channels. There has thus far been removed about 3,000,000 cu. yds. of material, and it is likely that the completion of the work will require three seasons more. It will be seen, therefore, that there exists a channel from deep water in the lake through Maumee bay and river up to the Lake Shore railway bridge with a full depth of 21 ft. at mean level, except in the small portion in the river where the depth is nearly 20 ft.

At Port Clinton harbor work is in progress under a contract for dredging and there has already been dredged a channel from the piers outward with depth of 13 ft. and 150 ft. width. This includes the removal of a large pile of rocks about 1,500 ft. outside the piers where there was but 7 ft. of water. Within this harbor there is a depth of about 11 ft. at mean level for a good available width.

At Sandusky harbor a contract has been entered into for dredging to a depth of 21 ft. through the entire length of channels. This work was begun very late this season and practically nothing will be accomplished until next spring. It is the intention then to open up the outer channel on the new range so as to avoid the use of the old Cedar point range. Many vessels have been in trouble at this location from following the new range through to the lake instead of using the Cedar point range for the outer portion of the channel.

At Huron harbor work is in progress upon the construction of three new cribs, each 122 ft. long, to be used in the reconstruction of the west pier. A stretch of 240 ft. of this pier was last year replaced by new work and the three cribs now under construction will probably be sunk early next summer.

James H. Reed, one of the best known mining captains in the Lake Superior district, died Saturday at his home in Ishpeming, Mich. He had sunk more shafts than any other man in the Ishpeming district.

BUFFALO LETTER.

Buffalo, Dec. 10.—Oh! for a good fleet of canal barges at this time of the year to load winter grain. It is true that the port has not needed them as much this fall as usual, but if there had been any more grain brought in here there would have been the usual trouble. One vessel agent declares that if there had been twice as much grain here as there was the elevators could not have handled any more than they have. Which means that the race between grain and bin room has been a very even one. The elevator capacity here is in much better shape than ever before, and it is handled more as a unit than formerly, so the only cause of complaint, if any, has been on account of the shortage of cars. Only the Lehigh Valley road has been well supplied for a considerable time, and some of the roads have been very short all the fall. So it will have to be accepted that the roads are not going to take care of the fall grain traffic at this port, and it is time for something else to do it. With a good fleet of thousand-ton canal barges there would be a large independent lot of room and it could be used to help out the fleet.

I find that there are good canal men here who are not sanguine of canal enlargement yet, even after Gov. Odell has said so many times that the thing to do is to go ahead with the enlargement. They say that he was a little scared before the election when he saw the canal strength over the state and had to do something. Then the report that he favored taking the canal off into Lake Ontario and losing it, gave color to this view of his lack of sincerity. Still we are not going to give the case up at all and if he does fail to fulfill his promises there is going to be trouble in Albany this winter.

There is also in this uncertain condition of things the advocate of government assistance, who declares that it would be easy to unload the canal on congress, so that the western demand for the canal, always pronounced, could find expression. But the New York politician, always anxious to cling to canal patronage, has managed to cling to the control and he has done what he could to let it die on his hands. It was a good idea to couple canal improvements with the good-roads idea. If the farmers get the one without agreeing to the other they will be shrewder than the canal men are.

There is another improvement in the canal line that Buffalo is out after, and that is the ship-canal to lower Black Rock, in order to make the entire Niagara front available as dockage room. It was a great blunder to spend money deepening the Niagara from the mouth of the lake down, but former engineers were timid and would not consent to come out boldly for what they must have seen was a necessity if the Niagara was to be a navigable stream. Major Symons believes that the ship-canal ought to be identical with the Erie canal along the city front, with a lock at the lower end of about 5 ft. fall. Below the International bridge in this city the Niagara is as still as a mill pond to within a short distance of the falls, so that the ship-canal will solve the entire problem.

The building of the long breakwater to the south of Buffalo creek invited the $40,000,000 steel plant and it is believed that the ship-canal will repeat the feat. Then the ambitious owners of land up Buffalo creek think they have in sight the deepening of that stream to abate floods and at the same time to extend navigation another mile inland. It sometimes takes self-interest and a lot of it to work out public benefactions. In lack of the nobler quality it will have to be confessed that self-interest has sometimes come to the assistance of mankind in a way that has answered much the same purpose.

The canal season has closed a second time with money in the pockets of the boatmen, who used to be about the most impoverished set of business men anywhere to be found. Till last season there had been only about one that could be called profitable for ten years. The change has mostly come about through the inability of the railroads to take care of all the grain. As for the canal being an actual competitor of the roads it has not for a long time. The boats are no longer much of a factor in the business, either in size or in number, so the roads merely fell down on their own account and the canal came to the rescue as well as it could.

Everybody who has studied the rail situation of late is convinced that the roads are becoming every year less able to take care of the business across country. If there had been 50,000,000 bu. of grain more to come here this fall than there was, as was the case more than once of late the roads would have been buried out of sight. It is very illogical for them to oppose canal enlargement.

JOHN CHAMBERLIN.

IRON ORE SHIPMENTS.

Complete figures dealing with iron ore shipments by lake for the season of 1902 will not be available until next week, as the last cargoes from Lake Superior ports are only now being delivered at Lake Erie docks and Escanaba is still trying to load a few more vessels. There is no doubt, however, of an excess of 27,000,000 gross tons in the aggregate output. Final reports have been received from Duluth, Two Harbors and Superior, where the aggregate exceeds 15,000,000 tons and where the great gains have been made. The figures from these ports are not official but it is not probable that the official statements will change them materially. Here they are:

	1901. Gross tons	1902. Gross tons.
Two Harbors—Duluth & Iron Range Ry..	5,028,000	5,605,218
Duluth—Duluth, Mesabi & Northern Ry..	3,437,955	5,598,408
Superior—Great Northern Ry.....	2,321,077	4,180,568
	10,787,032	15,384,194
		10,787,032
.....		4,597,162

With the steady increase in size of vessels the average cargo increases each year. The 11,203,626 tons of ore moved from docks at Duluth and Two Harbors this year went out in 2,205 cargoes, so that the average was therefore about 5,100 tons per cargo. The average cargo for the ore carried from the two places last year was 4,569 gross tons. Ten years ago it was not more than 1,000 tons.

HULETT BUCKETS FOR UNLOADING MACHINES.

The Webster, Camp & Lane Co. of Akron are equipping forty-two ore unloading machines at Lake Erie docks, belonging to the Pennsylvania railroad and M. A. Hanna & Co., with Hulett automatic unloading buckets. The unloading machines to which they are being attached are of the Brown and King Bridge type, which are at present equipped with hand-filled buckets. There are twelve of them in Cleveland belonging to the Pennsylvania railroad, twelve in Ashtabula belonging to M. A. Hanna & Co., twelve in Erie belonging to the Pennsylvania railroad and six in Buffalo belonging to M. A. Hanna & Co. The new buckets shown in the advertisement of the Webster, Camp & Lane Co. on page 31 of this issue, are of the two-part automatic type, similar in construction to the one put on the Hanna docks at Ashtabula and on the American Steel & Wire Co.'s docks at Cleveland. It is a clam-shell gravity bucket, specially designed for handling iron ore and having great penetrating and closing powers. The bucket weighs 3,500 lbs., and has a capacity for 1½ gross tons of ore. It will carry as high as 5,000 lbs. of soft ore and about 3,000 lbs. of the specular or heavy grades. Mr. George H. Hulett, the inventor, estimates that it will automatically unload 50 per cent. of the cargo of a vessel. These forty-two machines will be equipped with the gravity buckets by the opening of navigation next spring.

The Webster, Camp & Lane Co. are equipping thirty other machines throughout the country with this type of bucket.

LOSS OF LIFE ON THE LAKES IN 1902.

Quite a few of the best of the lake freighters, tempted by high rates offered for carrying coal to the northwest, are still in commission and some of them will not be tied up until Christmas time, but great care will be exercised in operating them, and it is hoped therefore that the accidents of the season, especially those involving loss of life, are over with. The season of 1902 has been a disastrous one as regards loss of life. A compilation from reliable sources of navigation shows a total of 140 lives lost in lake navigation during the season now closing, as against 132 in 1901, 110 in 1900, 100 in 1899, 95 in 1898, 88 in 1897, and 66 in 1896. Lake Erie, which last year had but eleven lives charged up against it, now leads all the other lakes with a total of 59. Lake Superior was the watery grave of 40, while in 1901 46 were lost there. Lake Michigan had but 14, Lake Huron 22 and Lake Ontario 5. Ten were lost in Detroit and St. Clair rivers. The increase from year to year in the number of lives lost has not, however, been in keeping with the great increase in the number of men employed on lake ships.

The efficiency of the life saving service and the weather bureau, two branches of the government that are near and dear to the vessel man, are commended more and more every year.

UNSUCCESSFUL EXPERIMENTS WITH ACETYLENE.

Some time ago Capt. George P. McKay, chairman of the committee on aids to navigation of the Lake Carriers' Association, received a letter from Francis H. Clergue of Sault Ste. Marie inquiring as to the use of acetylene gas in gas buoys for marine purposes. Mr. Clergue was under the impression that three or four years ago comparative tests were made in New York harbor but was unable to find the reports. Capt. McKay immediately inquired of Capt. William Folger, who is in charge of the lighthouse district at New York, but Capt. Folger replied that no experiments with acetylene buoys had been made in this country, adding that while several schemes had been proposed none of them had crystallized. He said the lighthouse department would test any working model which promised success. Inquiry in other directions developed the fact that the Canadian government is using Pintsch gas with about 20 per cent. of acetylene added to increase the brilliancy of the flame but that the expense and complications attending the method are very considerable. It appears that a number of experiments have been made with acetylene for buoy lighting but as yet nothing advantageous has been accomplished, the principal difficulty being to produce a reliable burner. They all become defective after a few days or weeks of service. The Safety Car Heating & Lighting Co. say:

"We recognize the value of the acetylene flame for use in reflectors or lenses and have carried on a considerable number of experiments ourselves and now have buoy lanterns burning at our laboratory in an effort to arrive at a suitable arrangement. The consumption of gas cannot be any less than with Pintsch light, although we believe that the light will be three or four times as effective if reliable."

LAUNCH OF ANOTHER BIG CAR FERRY.

The steel car ferry Manistique, launched at the Cleveland yard of the American Ship Building Co. on Saturday last, is a vessel worth probably $400,000 and is in all respects representative of the best type of car ferry on the great lakes. She is building for the Manistique, Marquette & Northern Railroad Co., of which R. R. Matheny is president and Daniel K. Kaufman vice-president and treasurer. Headquarters of the company are at Grand Rapids, Mich. It is the intention of the company to build a duplicate vessel later on. Terminals are being prepared for the service in which the vessels are to be engaged between Northport on Grand Traverse bay and Manistique, Mich. A lighthouse and other harbor improvements are needed at Northport, and there is much to be done in the way of slips, etc., before this new car ferry service is established, but this work, alike to the vessels, is planned in an up-to-date manner.

The Manistique is in nearly all respects a duplicate of the latest of the Pere Marquette car ferries, which were designed by Robert Logan of Cleveland. Her dimensions are: Length over all, 350 ft.; length of keel, 338 ft.: beam, moulded, 56 ft.; depth to top of shade deck, 36 ft.; mean draught, loaded, 14 ft.; trim draught, 15.6 ft. Her engine power is greater than Pere Marquette and the arrangement of her cabins is somewhat different. She will have triple-expansion engines with cylinders of 23½, 37 and 62 in. diameter and stroke of 36 in. Steam will be furnished by six Scotch boilers of 13 ft. 9 in. diameter and 12 ft. length, to be allowed 170 lbs. working pressure.

MAY FIGHT LONGSHOREMEN'S ASSOCIATION.

The annual convention of the International Seamen's Union was held at Milwaukee last week. During the meeting considerable hostility developed to the International Longshoremen, Marine & Transport Workers' Association on the ground that they were claiming dominion over those who properly belonged to the Seamen's union. Broadly speaking the Seamen's union claims jurisdiction over everyone who sails—that is over masters, pilots, firemen, oilers, water tenders, wheelsmen and watchers. They claim that the longshoremen should have no jurisdiction over men who are continually employed inside of vessels. The International Longshoremen, Marine & Transport Workers Association, however, have fully determined to control lake labor interests, even to the extent of severing connection with the American Federation of Labor, to which both the Longshoremen's association and the Seamen's union belong. The Seamen's union elected the following officers: President, William J. Penje, Chicago; first vice president, C. H. Harrington, San Francisco; second vice president, Victor Olander, Cleveland; third vice president, Daniel Sullivan, New York; fourth vice president, John Pilcher, Boston; secretary-treasurer, William H. Fraiser, Boston; delegates to the American Federation of Labor, Andrew Furuseth, William Penje and William H. Fraiser; legislative committee, Andrew Furuseth, Walter McArthur and C. J. Harrington. The next convention will be held in New York.

Two new steamers now on the stocks are candidates for the name City of South Haven. As whichever is launched first will be entitled to the name, the rival ship building companies, constructing the vessels, are engaged in an interesting speed contest. The contest in the shaping of steel and driving of rivets will not be ended for months, but when it does reach its climax the directors of one steamship company will have to hold a special session to determine upon a name for the defeated craft. The contestants are the Michigan Steamship Co., building a steamer at Port Huron for the Chicago-South Haven run in opposition to the Dunkley-Williams Co. The latter firm is bending every effort to complete work on its new vessel building at Toledo.

Subscribers who are receiving the Marine Review at the marine postoffice, Detroit, are advised to send to the Marine Review Publishing Co. their home address after the last trip in order that the paper may be mailed to them there.

The Fore River Ship & Engine Co., Quincy, Mass., has given a mortgage of $2,000,000 to the Adams Trust Co. of Boston.

AROUND THE GREAT LAKES.

Unless closed by ice sooner the Welland canal will be kept open for passing vessels until Monday, Dec. 15.

Capt. S. W. Gould's school for lake and ocean navigation has started for the winter at 265 Marcy avenue, Cleveland.

Monday, Dec. 15, is the date now set for the launching of the Anchor Line passenger steamer Tionesta at the Wyandotte yard of the Detroit Ship Building Co.

Capt. Gheen, late inspector of the eleventh lighthouse district, with headquarters in Chicago, has been retired with the rank of rear admiral. He has served in the navy for forty years.

Capt. Anthony Gallagher of the Goodrich Line, for thirty-five years a lake navigator, has retired. He will be succeeded by Capt. Elmer E. Redner, late master of the steamer Sheboygan.

A new merchandise dock will be constructed on Allouez bay, Duluth-Superior harbor, by the Omaha Railway Co. It is to be a duplicate of the company's present dock, which is one of the largest in the country.

Mr. T. F. Griffin of Corrigan, McKinney & Co., who was taken very ill a short time ago, and whose life was despaired, recovered sufficiently during the past week to be taken to a more suitable climate for the winter.

The wreck of the schooner Richard Winslow in the Straits of Mackinac has been blown up. The government inspector in charge of the work reports that the least depth of water now at the point where the schooner was sunk is 24½ ft.

The Polson Iron Works, Toronto, Can., is building two lightships for the dominion government—one for Anticosti and the other for the Nova Scotia coast. The steamers are to be about 150 ft. long and to cost about $100,000 each.

A complete Hoover & Mason automatic ore unloading plant, similar to the one now on the Nypano docks, Cleveland, is to be erected during the winter on the Cleveland & Pittsburg docks, Cleveland, which are operated by M. A. Hanna & Co.

The Chicago life-saving station has been closed for the year after an unusually quiet season. There has not been a wreck in the Chicago district in which the life savers are concerned. The crew was called out thirty-four times to rescue amateur yachtsmen.

The action of Steel Corporation officials in wintering as many boats as possible at the head of the lakes will provide employment for a great many men on repairs and fitting-out operations in the spring. It is estimated that about eighty vessels will winter at Duluth and Superior.

Officials of the American Ship Building Co. have made arrangements to enlarge dry dock No. 2 at the head of the river bed, Cleveland, which is now the smallest of the Cleveland docks. The dock, which is now 320 ft. long, will be lengthened 200 ft., and it will be 60 ft. wide after the change is made.

It is reported from Ishpeming, Mich., that officials of the United States Steel Corporation have decided to hold a celebration at that place next June or July in honor of the first mining work done by the Lake Superior Iron Co. fifty years ago, and that prominent officials of the organization will attend.

On the 5th inst., several days after the steamer S. J. Macy had foundered on Lake Erie, the keeper of the Long point light station, S. B. Cook, had not heard of the disaster. On that date he wrote the Review saying he had picked up near the station a pair of oars, about two-thirds of the side of a yawl boat, and a chair marked with the steamer's name.

Fourteen hundred and thirty thousand gross tons, just 30,000 tons more than the 1,400,000-ton mark aimed at by the management, but generally regarded in iron and steel circles before the present season of navigation opened as impossible, is the record for 1902 of Corrigan, McKinney & Co.'s great Stevenson iron mine on the Mesabi range of Minnesota, which has been in operation only two years and was not fully opened until late last year.

If present plans are carried out the revenue cutter Fessenden, which has been stationed at Detroit for many years, will be taken off the lake route and overhauled, Senator Burrows introducing a joint resolution in congress for an appropriation of $30,000 to provide new boilers. The engines in the Fessenden are very good, but the boat has never had sufficient steam power to drive them up to their capacity, which if done would make her a very fast craft.

Gordon O'Neil, third vice president of the International Longshoremen, Marine & Transport Workers' Association, has been in Detroit several days. He is on a trip through Canada. Mr. O'Neil is president of the Lumber Loaders' Union of Duluth. He says everything in that line is satisfactory at present, but it is hard to tell what will happen before spring. Committees have been appointed to meet the Lumber Carriers' Association representatives to fix the scale for next year.

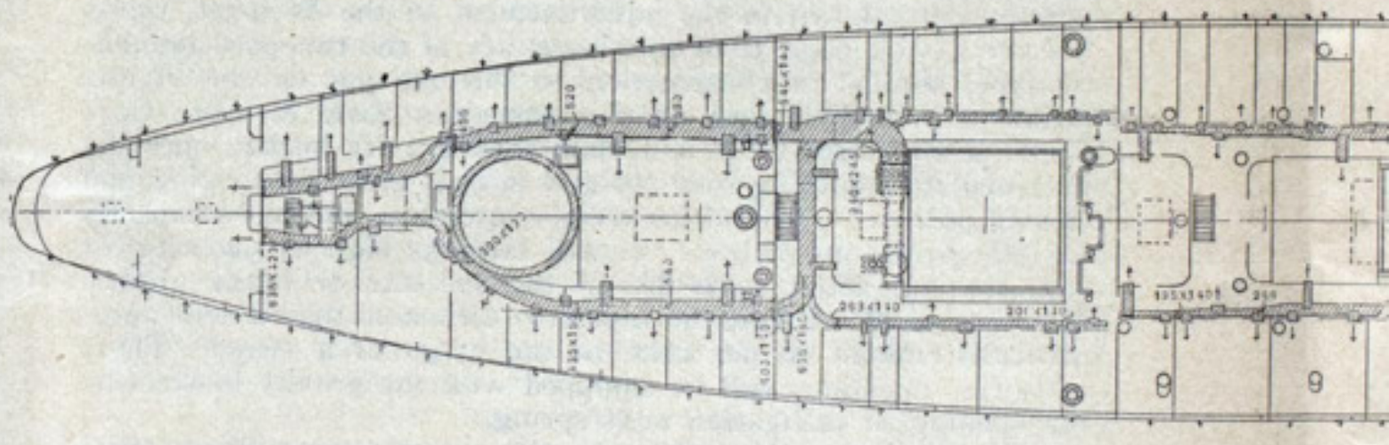
Steady growth of business at Ashtabula Harbor, especially the great increase in vessels taking ore in and coal out of that port this season, has brought out new houses in the vessel supply business. Among the latest are Topky Bros., who already enjoy a lucrative local hardware trade. They will seek vessel business for 1903, carrying a full line of marine hardware, including stoves and ranges. They will have facilities for doing all kinds of stove, range, brass, tin and glazing repairs, carrying also a line of paints, oils and cordage.

Work has already been started on approaches for the new ore dock of the Great Northern railway on Allouez bay, Duluth-Superior harbor. Men employed on the ore shipping docks during the navigation season are to be retained on the dock construction work. The new dock will be built on the same plan as the No. 2 dock, having the same hight, and will be equipped with the same sized pockets. It will not, however, be as long, it being the plan of the company to extend it out into the bay about half as far as No. 2, and if additional capacity is demanded the new dock will be extended in 1904 to an equal length with the other.

After thirty years of steady application to business in Bay City, Mr. J. D. MacKinnon, president and general manager of the MacKinnon Mfg. Co. has decided to retire and has turned over his interest to the other stockholders of this company. Mr. MacKinnon was one of the founders of the well-known Variety Iron Works of Cleveland, but in 1867 severed his connection with that concern and located in Bay City, starting in a small way in the boiler and iron working business. From year to year the works have grown, adding new departments until it is now one of the leading works of its kind in Michigan. The affairs of the company will now be in the hands of Mr. H. D. MacKinnon as president and general manager, Mr. A. C. MacKinnon as vice president and general superintendent and Mr. D. P. Lewis as secretary and treasurer.

HEATING AND VENTILATING PLANT OF A CRUISER.

Readers of the Review will know that the development of the cruiser as a vessel of war during the past few years has been very marked; that the cruiser, although retaining the high-speed characteristic, is becoming more and more like the battleship—certainly suited to following the flag in line of battle against the best second-class battleship. This brief introduction, showing the importance of modern ships of the cruiser kind, is prompted by a description of the heating and ventilating plant



Illustrating the Heating and Ventilating Equipment of

of the Dutch cruiser Konigen Regentes, received from the Buffalo Forge Co., Buffalo, N. Y. The apparatus for heating and ventilating this cruiser, which is about to go into commission, was furnished by the Buffalo company through their London office and through Ls. N. Alta & Co. of Amsterdam. The apparatus is all situated on the berth deck and comprises two separate and distinct plants. The larger plant controls the midship and forward portions of the ship, while the after portion of the vessel is controlled by the smaller plant. The details of construction present some interesting features. The forward apparatus, which is situated just aft of the foremast, consists of one 70-in. Buffalo steel plate exhaust fan, which is direct-connected to a 5-H. P. General Electric motor and 2,205 ft. of heater arranged in five sections, each section being placed in angle iron frames to prevent their slipping by rolling of the ship. Each steam coil section has four rows of staggered 1-in. pipe and they are 8 in. wide, 4 ft. long and 5 ft. 10 in. high. Before leaving the works of the Buffalo Forge Co. these coils were tested to 150 lbs. per square inch hydrostatic pressure. They are to operate under a maximum steam pressure of 120 lbs. per square inch or so much less as may be necessary with warmer outside weather. The main supply to the steam receiver is 2 in., while the drip connections are 1 in. in diameter. These heater sections are encased in a sheet steel heater case connecting the fan to the heaters. The Buffalo steel plate fan has a capacity at the outlets of 10,700 cu. ft. at 360 revolutions per minute. The fan is of the regular Buffalo full-housing type, stiffened and braced with angle iron after the standard construction.

The ducts which convey the air to the different compartments of the ship are of special construction. They consist of an inner duct of ⅛-in. steel, around which is 1 in. of asbestos lagging, and covering this is another steel duct of ¼-in. metal. Where these ducts pass through water-tight bulkheads a steel gate is so arranged that the duct may be closed immediately, thus rendering the compartment absolutely water tight.

The after apparatus is situated just forward of the mainmast, consisting of a 60-in. full-housing Buffalo steel plate fan,

direct-connected to a 4x3½-in. double-acting enclosed Buffalo engine. This engine runs at a speed of 400 revolutions per minute, and at this speed the fan has a capacity of 6,100 cu. ft. of air delivered at the register outlets per minute. The heater consists of five sections, each similar to those of the other heater, and contains 1,365 ft. The main supply to the steam receiver is 1½ in. When outside conditions require, a pressure of 120 lbs. per square inch may be applied to the heaters. The engine works under any pressure from 120 to 250 lbs. per square inch. The cylinder of this engine was tested to a hydrostatic pressure of 290 lbs.

The heaters thus described are of ample capacity to heat the quantities of air which the fans are guaranteed to handle and deliver through 105 registers to such a degree that the temperature of the ship can be maintained at 22° Celsius with an outside temperature of 4° Celsius, when all the air is taken from the outside and when the heaters are supplied with a steam pressure of 120 lbs. per square inch.

ADDRESS ON THE 1,000-TON BARGE CANAL

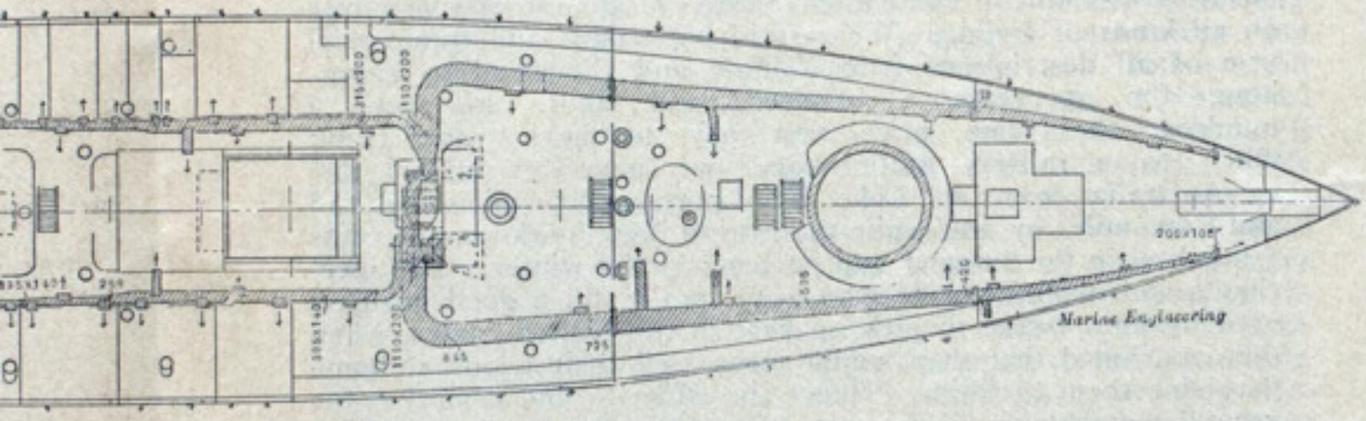
Mr. Herbert P. Bissell of Buffalo, at the banquet of the Tonawanda board of trade, spoke upon the 1,000-ton barge canal as follows:

"We have been for several years confronted with the grave question of retaining that greatness and supremacy by the immediate and adequate improvement of our great highway of commerce or of losing it by the abandonment of the Erie canal, which must surely result from the failure to soon improve it. The canal has been twice enlarged, the last enlargement being completed forty years ago and admitting of the operation of a boat bearing 240 tons of freight or 8,000 bu. of grain. Since 1862, however, there has been no consistent improvement whatever, while all other means of transportation have steadily improved their methods and capacities. Only think of the increase in tonnage of the vessels upon the great lakes from the 64-ton vessel, which was built by LaSalle on the Niagara river in 1679, to the 9,000-ton vessels now sailing between Buffalo and western points. Consider also the increase in the capacity of a railroad car from 20,000 lbs. thirty years ago, to 80,000 lbs. today, while the tonnage of the canal boat is 240 tons today, just as it was in 1870, and just as it was in 1862. Is it not, then, high time that an enlightened statesmanship should be applied to the canal policy of this state? Fortunately, for the maintenance of our imperial commercial position, three years ago an able, strenuous and enlightened governor appointed a committee of competent and earnest citizens of which Gen. Francis V. Green of New York was chairman and Maj. Thomas W. Symons was one of the most efficient and industrious members, to consider the broad question of the proper policy which the state of New York should pursue in the canal matters. Two years ago this committee made an exhaustive and able report recommending that the canal should not only not be abandoned, but that it should be enlarged and improved so that barges bearing 1,000 tons of freight can be operated in fleets of four or six boats carrying from 125,000 to 200,000 bu. of grain. They recommended a plan to construct practically a new canal from Lake Erie to the Hudson river, following the present route for something over two-thirds of the distance and new routes for the remaining distance of a little less than one third, utilizing the existing structure and prism so far as they can be made use of. While the sum of money required to put this plan into execution is large, being estimated at about $80,000,000 for the improvement of all of the canals, the resources of the state of New York are now so enormous that the financial burden will be comparatively light. Many times lighter, indeed, than was the burden upon the shoulders of our earnest and energetic forefathers when they appropriated $9,000,000 to be raised by direct taxation for the original canal.

It requires only a superficial review of the history of the Erie canal to convince any loyal citizens of the state of New York of its incalculable value to the whole state, while to us on the Niagara frontier a 1,000-ton barge canal means an increase in wealth, population and prosperity impossible to estimate or foretell. Moreover, we should never forget that the great state of New York collected in tolls from the commerce of the Erie canal up to the close of 1882, when it was made a free waterway, the sum of $121,461,870, while the cost of maintenance to 1896 amounted to but $37,681,080 and the cost of the construction and improvements to that year were $56,164,973, leaving a profit to the credit of the Erie canal on the books of the treasurer of the state amounting in 1896 to $27,615,817. Such is the magnificent showing, in spite of all of the extravagance and mismanagement and corruption that were frequently charged up to that time. The $9,000,000 appropriation, concerning which there has been so much discussion in political campaigns, must be deducted from this profit, and it may be that that amount was almost wholly wasted, but even then there is a net balance to the credit of the Erie canal on the books of the state treasurer of about $20,000,000. Such is the business showing without any consideration of the enormous benefits accruing from the development of the cities along the line of the canal, from the development of the cities of New York, Buffalo and North Tonawanda at the termini of the Erie canal, from the development of the commerce upon the great lakes and from the development of the territory in the northwest.

"We have been accustomed to regard the canal as mainly useful for the transportation of breadstuffs, coal and lumber. You are well aware of its usefulness and value in the transportation of lumber, and I will pass it by and present to you as an attractive illustration of the benefits to be derived, both in the Tonawandas and Buffalo from its improvement and development of the iron and steel industry on the Niagara frontier. A few years ago William A. Rogers and his associates of Buffalo rebuilt in North Tonawanda the blast furnaces which had lain for many years in ruins. Clear headed business men have recently turned their attention to the favorable location of the Niagara frontier for the iron and steel industry. The Lackawanna Steel Co., with a capital of $40,000,000, has removed its large plant from Scranton and is now completing one of the finest steel plants in the world at Stony point. Mr. Rogers, associated with the Messrs. Goodyear, has arranged for the construction of extensive blast furnaces on Buffalo harbor, while the firm of M. A. Hanna & Co. of Cleveland, is now operating three large blast furnaces on the Buffalo river. Now, why has the Niagara frontier been selected for this industry? It is due entirely to the magnetism of the cheap transportation facilities; it is because the raw material for the manufacture of iron can be assembled at Buffalo and Tonawanda at as cheap a rate as at any point in the United States, and our location for the cheap distribution of the manufactured product is more favorable than any other point in the United States. In centuries past nature deposited a great mass of thousands of millions of tons of iron ore in the regions of Lake Superior, and this ore can be brought to the foot of the great lakes by water transportation as cheaply as it can be brought to Cleveland or to Conneaut, and from Conneaut it must bear freight charges to take it to Pittsburg, which has heretofore been the most advantageous point for the manufacture of iron.

"Now, when a suitable waterway and enlarged 1,000-ton barge canal upon the plan of the canal committee is provided through the state of New York, it is as certain as anything in human foresight can be, that Western New York, the route along the line of the Erie canal, the Mohawk valley and the Hudson river will become the great industrial beehive of this country. The proposition is absolutely true in commerce that the country that can produce the cheapest ton of iron will hold the leading place in the world's prosperity. This is as sure as that the sun will rise tomorrow and with cheap transportation facilities, the state of New York will reap the lion's share of this prosperity. The Lake Superior region to which I have referred last year produced 20,000,000 tons of iron ore and it will this year produce about 25,000,000 tons and this iron ore can be brought by water to Buffalo and Tonawanda cheaper than iron ore for the manufacture of iron can be laid down at any other point in the world and the Erie canal, enlarged and improved, will give the shipper of iron manufactured at either Buffalo or Tonawanda, an advantage of at least $2 per ton over Pittsburg iron in the eastern market. Consider, then, the possibilities of the iron and steel manufactures at Buffalo and Tonawanda and at other canal points in the state. The ore will be brought down to us from the Lake Superior region at the same cost as to Conneaut, O. The ore may be sent forward on the 1,000-ton barges to blast furnaces along the canal or the pig iron may be manufactured at Buffalo or Tonawanda and be forwarded in the 1,000-ton barges down through the state at such a low rate that innumerable manufacturing concerns requiring the melting of pig iron will flourish here and multiply and employ labor to such an extent that a new impetus to great wealth will be given to the entire state of New York. This argument will apply with equal force to every city along the line of canal, but the Niagara frontier cannot fail to enjoy especial benefits because, added to those I have already mentioned, a great manufacturing center must also result from the development of the vast amount and low cost of electrical power at Niagara Falls. With this great improvement made, the Erie canal will become commercially more important than the Suez canal or the proposed Nicaragua canal, for not only shall we enjoy in a greater degree the advantages of the grain trade, the lumber trade and the creation of a great manufacturing center, but also the control of the iron industry of the world by the citizens and manufacturers of the empire state."



ting Equipment of the Dutch Cruiser Konigen Regentes.

Interesting Interview with James J. Hill.

Mr. James J. Hill, president of the Great Northern railway, has been interviewed in Washington by William E. Curtis of the Chicago Record-Herald. The interview deals with the so-called trusts, ship subsidy and other matters and is especially timely and very interesting. Mr. Hill refers to President Roosevelt's utterances in his last message to congress when he says:

"The president's remedy for what are called trusts is all right, assuming that you want to encourage what is good and prevent what is bad. There are different kinds of trusts. Some of them are formed for good purposes and serve the public welfare, and the president and members of congress and other intelligent people ought to be able to discriminate between honest and dishonest corporations. Take Herr Krupp, the great German ironmaster, who died the other day, as an example. He was a very rich and powerful and benevolent monopolist, and made Germany richer and more prosperous and his 45,000 employes happy. There are other good monopolies. The large number of consolidated corporations are honest and well managed, and are for the public welfare. Others, however, were organized for speculative purposes and capitalized at enormous figures to sell stock to people who don't know any better than to buy it, and such schemes ought to be crushed out. The remedy is simple. Compel them to make a show down, before it is allowed to put its stock on the market. Make them show what they have got and what it is worth. If a company in Rhode Island wants to sell stock in California it ought to be required to give people out there an honest statement of its business, as national banks and insurance companies are compelled to do.

"I am not opposed to the shipping subsidy bill," continued Mr. Hill, "and I do not object to its passage by congress if the financial aid of the government is necessary to the support of other steamship lines, but if I had supposed that our steamers to Japan and China could not run without it, I would feel that we had made a mistake by going into the business. We have established our connections and are building ships without counting upon it. One of our ships is all ready to float. The upper works are on and are painted, and she will be launched very soon. The other one is almost ready for launching, and both of them will be in shape to go into service before the early spring. They are the biggest ships ever built in the world, and will carry more cargo than any other thing that floats, and, as I said, we would not have built them if we were dependent upon the passage of the subsidy bill. Nevertheless, if congress votes a subsidy bill, we will not refuse our share of it, and will make the best use we can of the money.

PLEA FOR IRRIGATION APPROPRIATIONS.

"So far as I am personally concerned I would put the money into irrigating ditches and reservoirs in order to furnish homes for the coming generations that are beginning to crowd each other already. There are some figures running in my mind. At the time the civil war closed we had a population of 34,000,000, and have been increasing at the rate of 1,600,000 every year since. At that rate the gain in twenty-two years will equal the entire population in 1865. The census reports since 1790 show that we double our population every thirty years. At the close of the civil war all the land in northern Wisconsin, western Iowa, western Minnesota and west of the Mississippi river to the Pacific ocean was practically vacant. Today, speaking generally, there is no arable land to be had anywhere upon the public domain. There is not an acre of public land where a man can raise a crop of potatoes or grain without irrigation. If that change has taken place within the last thirty-seven years, what shall we expect in the next thirty-seven years? Where are the people to live who come to us from foreign countries at the rate of half a million a year, and what are we going to do with the natural increase of our own people? The northwest is already getting so crowded that more than 25,000 farmers have gone over the line into British Columbia. The Canadians claim 75,000, but that is excessive. They were good farmers, industrious, intelligent and well-to-do, and had the capital to buy outright from 1,000 to 2,000 acres of land from the dominion government, and have taken the oath of allegiance to King Edward. We could have kept them on our own side of the border if we could have given them irrigated lands.

"One thousand acres with irrigation is as good as 5,000 acres without; that is, as many people can be maintained upon a thousand acres under irrigation as upon 5,000 acres of fertile soil depending upon natural rainfall. Therefore, if we can make one acre of land do the work of five, it is worth while trying it. Irrigated land sells for $15 and $20 an acre. Arid land without irrigation is practically worthless, and I can think of no better investment for the government; no more profitable speculation, so to speak, than to build a few reservoirs and irrigating ditches in favorable districts where it can be done at a small cost and thus convert worthless land into twenty-dollar-an-acre farms. It would need only a small amount of capital to start with, and the proceeds could be set aside as a fund to keep the scheme going—to build more reservoirs and more irrigating ditches until the profits grew into enormous sums, when they could be added to the public revenues.

"See what England is doing in Egypt and in India and you realize that there is great danger to us from that competition—so great that our statesmen ought to be thinking about it. We are building up a trade in flour and other breadstuffs in China. We are cultivating among the Chinese an appetite for our flour, and by and by we hope that they will like it as well as rice, but we have to furnish it as cheap as their rice, and must get ready to meet the competition of Egypt and India flour in those same markets. If England continues to repeat her Indian and Egyptian irrigation enterprises she won't need to buy wheat and flour of us much longer, and when England stops buying our grain it will rot in the fields and the elevators. It is the fashion to abuse the English, but we ought not to forget that they are our best customers, and also that they are the only nation that does not discriminate against us."

A MISTAKE TO ABANDON FOREIGN TRADE FOR TEMPORARY HIGH PRICES AT HOME.

Mr. Hill repeated what he has said on several occasions of late—that our manufacturers made a mistake in abandoning a trade they had built up in the Orient when they found after the boom started in some time ago that they could get higher prices at home. On this score he said:

"There is to be an enormous development in China. They are getting ready for it over there. Our exports increased rapidly until the boxer rebellion, when business was all broken up for about two years, but it has been resumed and is growing faster than before. But there is great danger that the United States may not be able to participate in the profits for several reasons. In the first place, our American manufacturers dropped the trade when they found they could sell goods to equal advantage in the home market. They were very short-sighted. When business was dull in the United States we gave a very low rate on all kinds of freight. We carried wire, nails and commercial iron of all descriptions from Buffalo and Cleveland to Hongkong for 45 cents a hundred, and flour, 40 cents a hundred, the same price you pay to have your trunk taken to a railway station—and we gave a similar rate to Australia from all Lake Erie ports—2,000 miles by rail and 8,000 miles by sea, while the rate to New York was 25 cents a hundred in the summer and 30 cents in the winter. The merchants and manufacturers who went into it did a good business until business began to pick up here in the United States, when they concluded that they would rather sell their goods at home than ship them to China. Hence the effort to find a market for general merchandise in the east was practically abandoned. Our merchants voluntarily withdrew, the Germans went in and got the trade and will keep it. It's the same old story; you have heard it over and over again. The experience has been repeated in Brazil and Africa and elsewhere. When our manufacturers have a lot of goods that they cannot sell at home they spend time and money working up a foreign trade, and as soon as the home market revives they neglect their foreign customers and lose them. We might have had the best of the Chinese trade if we had kept our boat in the stream, but it's all gone to be worked up again, and you can never regain what you have lost.

"Another disadvantage that our manufacturers will have to meet is that it costs so much more to manufacture things in this country than in Germany and Europe. Our machinery and agricultural implements will take care of themselves. They are so much superior to everything made in other countries that they create their own market, but it's the thousand and one little things that I am talking about. Last year we manufactured $1,300,000,000 of merchandise in this country and exported only $440,000,000. Out of our $1,500,000,000 exports, $1,060,000,000 came out of the ground, so that the manufacturers really cut a small figure beside the farmers, although they are growing fast. They must grow faster, however, in order to give people something to do. The 1,600,000 people that are added to our population every year must be employed, and that will cause an overproduction like that from which we suffered a few years ago. Our productive movement has gained such an impetus during these years of prosperity that conditions will be a great deal worse than they ever were before unless we find markets in foreign countries."

"We can find these markets," Mr. Hill continued, "by negotiating reciprocity treaties with every nation that can buy our goods. The Republicans must adopt that policy even though it may be disagreeable to the sacred cow they worship."

"With what nations would you suggest that we make our treaties?"

"With China to begin with, where they are eager to exchange trade; with Germany, France, Russia and the Spanish countries of Central and South America. Wherever we can make a trade in tariffs that will, as Blaine said, furnish a market for another

barrel of flour and another pound of pork, we ought to do it; and unless it is done this country will soon find itself again in a condition of over-production that will destroy our prosperity and our happiness. The sacred cow cannot stop the increase in population; it cannot find work for them to do, and they cannot sell all the results of their labor in the home market."

"Would you restrict immigration?"

"No, let 'em come in under proper regulations. We don't want any paupers or lunatics or anarchists, but can take care of all honest people that are seeking labor and homes. But I would not give them suffrage. I would amend the naturalization laws and offer citizenship as an inducement for people to buy land and build homes. If a man has the enterprise and industry to buy a farm or build a cottage he is a good citizen. The man who cultivates his own ground and lives under his own roof is a better citizen than a man who works for a day's wages and sells his vote for $2; and men do that because they do not realize that the right of suffrage is worth more."

MARVELOUS SYSTEM OF STEAM SHIP PROPULSION.

American Marine Co., organized under South Dakota law with a capital of $10,000,000 (full paid and non-assessable) with offices at New York city, is the title of as extraordinary a prospectus as has ever come to while away a listless hour and to send one dreaming of untold wealth. The prospectus is a perfectly frank document. It states that United States and foreign patents are pending for a new system of propelling water craft at an average speed of about 60 miles an hour, making possible the successful operation of vessels twice the size and capacity of the largest in use today at an expense slightly exceeding the annual gross expenses of a large liner, while the gross receipts would be four times as great, for these new ships will have twice the capacity of the old and can easily make twice the number of trips. The prospectus says this without once stopping for breath or punctuation and then utters this solemn truth which nobody can deny, which nobody can deny: "A line running vessels across the Atlantic in forty-eight hours will readily find passengers and freight to test its capacity." The high rate of speed, the prospectus tells us, is attainable by an entirely new method of applying the propelling power. It is not an attempt to improve on the universally accepted method of propelling steamships but commences with a fundamental principle and follows out new lines. An "explanation" of the system is contained in the prospectus. Following is an extract from it with no attempt to straighten out bad sentences: "We will use the side-wheel steamer (for illustration) as there is a slight similarity in the principle implied. A first-class vessel of this type is capable of attaining a speed of about 15 miles an hour, being propelled by two paddle wheels of about 30 ft. diameter with paddles 2 ft. deep by 10 ft. wide. Five of these paddles on each wheel would be in the water at the same time, but only three on each side will be exerting a directing propelling force, as on each wheel one paddle would be entering the water and one leaving, so that 66 2-3 per cent. of the paddle surface in the water would be creating an unavoidable counter resistance. These 30-ft. wheels at fifty revolutions per minute travel about 4,500 ft. per minute, or 51 miles an hour. By deducting the 66 2-3 per cent. counter resistance from the paddles the rate of speed at which the vessel should travel is 17 miles an hour, minus the resistance from the water and air which in this instance amounts to 2 miles an hour. In the bottom of the hull, the length of the vessel, four open tunnels or archways are built; at each end of the tunnels a 20-ft. driving wheel is located, and running through each tunnel and over the driving wheels is an endless paddle chain with paddles 6 ft. wide by 3 ft. deep set in the chain every 10 ft. To sustain the weight of the chain a narrow shelf-like projection is built along the sides of the tunnels, on which rests a shaft extending from the center of each end of the paddles. The paddles form part of the chain, it and the links, one running from the center of each side being made in one casting. The ends of these links or blocks are corresponding hooks and eyes and by hooking the paddles together forms an endless chain without the use of a bolt or nut, and so arranged that the greater the pressure the more strongly they hook together. The driving wheels for each series of chains are similar to an immense cog wheel, having 18-in. grooves sunk in its surface every 10 ft. These wheels are made U shaped at the circumference so that they catch the paddles at the center on both ends. The paddles fitting into the grooves like cogs and as the wheels revolve they carry the chains around with them. On the large vessels with 900-ft. tunnels, there would be 360 paddles always in the water, or 6,480 sq. ft. of surface exerting a propelling force (side-wheeler has 120 sq. ft.) The tunnels being but 6 ft. deep there would be but one paddle at each end entering or leaving the water, or 144 sq. ft., which is 1.92 per cent. of the total surface exerting a direct propelling power. Speeding the driving wheels ninety revolutions (200 can easily be attained) they would travel 8,100 ft. a minute or 92 miles an hour. By deducting the 1.92 per cent. counter resistance gives 90 miles an hour and allowing for a proportionate resistance from water and air of 15 miles an hour, the rate of speed possible at ninety revolutions would be 75 miles. The lost energy would be slight, as the paddles working 20 ft. below the surface of the water would have greater leverage than if working in loose water. The sides of the tunnels extending below the bottom of the paddles prevent the water from escaping at the ends of the paddles and by increasing its density the propelling apparatus is able to exert much greater power than would otherwise be possible. This system will make possible the operation of vessels 1,200 ft. long in which all the desirable features of the old system will be combined with many original features of merit."

And there you are. But listen—this is where the prospectus really begins to talk. The length of the proposed vessel is 1,200 ft., the width 125 ft., height eleven decks and tonnage 50,000 tons. Its maximum earning capacity operating between America and England is represented to be as follows:

3,000 passengers, first class, $75	$ 225,000
7,000 second class passengers, $50	350,000
Express mail, first class freight, etc., shipped in loaded cars, three decks of tracks, ten tracks per deck, thirty cars per track, 900 cars of 20 tons each, 18,000 tons, average $10	180,000
Receipts for one trip	$ 755,000
Annual receipts from ninety-six trips	72,480,000

The cost of operating the steamer will be $60,000 per trip, or $15,410,000 for the year, leaving, as anyone can figure for himself, a surplus of $57,070,000 on the year's business. Col. Mulberry Sellers will now take a back seat. And as for the Morgan combination what could ever have possessed Pierpont Morgan, sensible man as he is, to have paid $10,000 for every $1,000 share of the White Star Line when he must have known that they were only equipped with twin screws.

PROGRESS OF WORK AT MORAN BROS. YARD.

Moran Bros. Co., Seattle, Wash. recently launched the lighthouse tender Heather in the presence of a number of naval officers from the Puget sound navy yard and the lighthouse service. Music was furnished by the Puget sound navy yard band and interest was added to the occasion by the presence of the lighthouse tenders Columbine and Manzanita. Miss Langfitt, daughter of Maj. W. C. Langfitt, lighthouse engineer, christened the vessel by breaking the customary bottle of wine. The Heather is of the following dimensions: Length over all, 178 ft. 6 in.; beam, molded, 28 ft. 6in.; depth of hold from top of keel to top of beam amidships, 14 ft. 11in. The boilers and machinery are now being installed and it is expected to deliver this vessel to the government in about three months.

There are nearing completion at the works of Moran Bros. Co. two steel tugs, 90 ft. long, the Wyadda and Bahada, for the Puget Sound Tug Boat Co The propelling machinery of these vessels consist of one single-ended cylindrical boiler, 11 ft. in diameter and 11 ft. long, allowed a working pressure of 160 lbs. and a compound engine with cylinders of 13 and 30 in. diameter with stroke of 24 in. The auxiliary machinery is to be complete, including steam capstan and windlass and electric light plant.

The framing of the battleship Nebraska is nearly complete for the lower structure. The machinery for the vessel is also well under way.

New boilers and machinery are being installed in the steamships Umatilla and Cottage City, both belonging to the Pacific Coast Steamship Co. New boilers are also being installed in the steamers Mainland and George E. Starr.

The Harlan & Hollingsworth works of the United States Ship Building Co. at Wilmington, Del., has under way some vessels of a kind that the ship builder is usually proud of. One of the late orders is that of the Baltimore & Philadelphia Steamboat Co., commonly known as the Ericsson Line, for the construction of two propeller passenger steamers which are to ply between Philadelphia and Baltimore. They are to be sister ships, with length of 203 ft., moulded beam of 23 ft. 5 in. and depth 12 ft. Their engines will be four-cylinder triple-expansion, with diameters of 21, 32, 35 and 35 in., with 24 in. stroke. This yard is also to turn out an auxiliary yacht for Mr. Albert C. Bostwick of New York. Dimensions are: Length over all, 162 ft.; on water line, 120 ft.; moulded beam, 28 ft. The design is by Carey Smith & Barbey, naval architects of 90 Wall street, New York.

The Union Steel Co. is to be financed as a $75,000,000 concern. There is to be a bond issue of $25,000,000, in addition to the authorized stock issue of $50,000,000. About $18,000,000 of the bonds and about $33,000,000 of the stock will be issued at once. Of the bonds issued a sufficient sum will be placed in a sinking fund to redeem the existing bond issues of the Sharon Steel Co., amounting to $3,591,000. The bonds and stock of the Union Steel Co. not issued at once will be available for the acquisition of other properties. The railroad from Elk Creek harbor to Pittsburg will be financed independently with stocks and bonds probably aggregating $25,000,000.

Great men of ships—Noah, Christopher Columbus and J. Pierpont Morgan.

SHIP BUILDING AT NEWPORT NEWS

Newport News, Va., Dec. 11.—The arrival in Hampton Roads from Cramps' ship yard of the new battleship Maine, which is expected in the next two weeks, is being awaited with considerable interest here, by reason of the fact that she is a sister of the battleship Missouri, which is approaching completion at the ship yard. The entire navy is looking forward to the completion of the Missouri, as well as the Ohio, building at San Francisco, with more than common interest, as the opportunity will then be presented of comparing better than ever before the skill of three great American ship yards. These three battleships were awarded to their builders on their own plans. The navy department called for bids on the department's designs for 16-knot ships and asked the yards to submit their own plans for 18-knot ships. So well pleased were the naval chiefs with the result that the contracts awarded called for 18-knot ships on the designs furnished by the ship builders. The Maine is distinctly a Cramp product. The Missouri will be a Newport News product in its entirety. The Ohio will be an original Union Iron Work's product. These are the only ships in the navy built or building under similar conditions. Hence the interest among naval officers and ship builders to compare results.

It is now expected that the new Pacific coast lumber steamer Francis H. Leggett will be launched early in January and that the keel for the battleship Louisiana, which the ship yard will build in competition with the government's Connecticut, a sister, will be laid on the ways to be vacated by the Leggett, in the extreme north end of the yard. The armored cruisers West Virginia and Maryland are really at the launching stage now, but it is understood that the company will not put them overboard for some weeks yet, desiring to advance them as far as possible before sending them into the water. Whether or not both ships will be launched on the same day has not been stated. There is about 4 per cent. difference between them. Should both ships be launched together attendance will doubtless exceed the great throng of 30,000 people who saw the twin battleships Kearsarge and Kentucky go overboard, Mar. 28, 1898. The launching of the Maryland alone is expected to draw an immense crowd from the state after which it is named.

The Newport News Ship Building & Dry Dock Co. is trying an interesting experiment in its drafting department. The company has at work about a dozen young women who are employed as tracers. Should the move prove successful it is expected that 100 young women will be put to work permanently. As tracers girls are said to be superior to men.

A contract has just been signed between the Hampton Roads-Norfolk Ship Building & Dry Dock Co. and Engineer Ferdinand Haenselman of Norfolk, whereby the latter will be in charge of all of the surveying and grading of the 700-acre tract the company has recently purchased for ship yard purposes at Sewell's point on Hampton Roads and opposite this city. Of course the ship yard will not cover the entire tract; possibly 50 acres will be improved. Something like $5,000,000 will be invested at the start, it is said. Within the past week work has been started on the enterprise, a force of 100 men being employed clearing off the timber and grading. The site extends 5,110 ft. along Hampton Roads and back through the country to Boush's creek 9,000 ft. The promoters of the project say they will build a dry dock 1,000 ft. long and also a marine railway for small vessels. The superintendents of construction and machinery and the general manager will take up their residence on the tract at once, houses being erected for them.

The battleship Texas, which had to go back to the navy yard for repairs while on her trial after being out of commission two years for remodeling, is without doubt the most unlucky ship in the navy. Her first mishap dates back almost from her construction at the navy yard. Many men were injured while she was being built. She sank a vessel in New York harbor while undergoing a dock trial. When she was placed in dry dock it was found that her hull was not strong enough to bear her weight. She was taken back to the navy yard across the Roads and straightened out. After being commissioned she went aground in Newport News harbor. Later, while lying at the Brooklyn navy yard, a seacock was left open in some way and the battleship sank. She was raised again. Feb. 7, 1897, one of her launches blew up in Boston harbor, several men being hurt. Dec. 3, 1897, she went aground on Wallabout bay. She rendered good service during the Spanish-American war. Oct. 29, 1898, a log got in one of her propellers, while the ship was off Cherry island, and worked considerable damage. Several days ago one of the motor cylinders which returns gun to battery under fire cracked during gun practice off the Capes and the vessel had to return to the navy yard, being prevented from joining the Caribbean fleet in time for the naval maneuvers.

The water-carrying ship Arethusa, Capt. Secombe, sailed out of Hampton Roads several days ago for Culebra island with 2,800 tons of fresh water for the use of the men on the ships of the Caribbean fleet. The Arethusa was fitted out at Philadelphia several years ago and only returned recently from the Philippines, where she was stationed two years. She has twenty separate water compartments, which can be emptied and filled at the rate of 10 tons in twenty minutes.

The torpedo boat destroyers Barry, Bainbridge and Chauncey, from League island, arrived at the navy yard and were placed in reserve. The monitor Arkansas sailed from the navy yard for Annapolis. The auxiliary cruiser Buffalo sailed from the navy yard for New York. The auxiliary cruiser Panther arrived in Hampton Roads Sunday from Colon with 320 marines, most of whom are ill with malarial fever after a stay on the isthmus of Panama for six weeks guarding the railroad. Orders have been received at the navy yard to commission the monitor Puritan and send her to Charleston. Rear Admiral Bradford, chief of the bureau of yards and docks, spent a day this week at the navy yard on a trip of inspection. Com'dr. Richard Inch, U. S. N., senior inspector of machinery at the ship yard, has returned from Washington, where he went to take an examination for promotion to captain. Lieut R. O. Bitler, U. S. N., has been detached from the training ship Alliance and ordered to the ship yard here as inspector of ordnance.

HE FAVORS DISCRIMINATING DUTIES.

Editor Marine Review:—Have just read the short review of Wm. W. Bates' "American Shipping" in Marine Review of the 27th. and from the synopsis given it occurs to me that Mr. Bates has given the proper que for assistance to our Merchant Marine. As I take it, his plan contemplates making the other fellow pay the freight, while a subsidy would have to be paid direct by the people of the United States. In other words by his plan Uncle Sam could take a rest and "let the other fellow walk the floor."

It is plain to see why a subsidy bill would be antagonized by the voters of the United States, but present a proposition to them which places the tax for the relief and upbuilding of our merchant marine on foreign ships, where it rightfully belongs, and the voter with the good of his country at heart would undoubtedly exclaim, to congress "lay on MacDuff," of that kind of tax you can't give us enough.

At present we levy a heavy tax called duty on about everything which foreign ships bring to our shores, while the ships go comparatively free. It might be that people like Mr. J. P. Morgan would not relish such a move as suggested by Mr. Bates, but I'll warrant the American ship builders, owners and masters would fall into line very quickly, as they would see in such legislation as suggested, a far better plan for increasing our merchant marine than all the subsidies between here and kingdom come. Most surely no protectionist could offer objection to such legislation, while even free traders would have to acknowledge that such protection as proposed would really be protection for the many instead of the few, and that while it protected it would not foster obnoxious trusts, unless perchance a Morgan should arise to merge the whole American merchant marine into one corporation, a possibility too far away in the dim distance of the future to cause much worry, except to Mr, Morgan who would probably worry over a plan to get his foreign merger ships an American register.

By all means let us give American shipping the benefit of a proper tax on foreign vessels, which, while not increasing the cost of their cargoes to the American consumer would greatly enhance the chances of American ships doing the carrying from and to our shores, now done by foreign-built and foreign-manned vessels. Then perhaps there wouldn't be so many foreign ships lying in New York and other harbors of the United States awaiting a charter, of which they stand a far better chance of securing than an American.

A trip along the wharves of New York will convince anyone that something should be done, even though it be something radical, in order to encourage American shipping. The ships cost less built in Great Britain than in the United States, and yet, not satisfied with that advantage the wily Briton often mans his ship with such crews as no American would, if he could, secure. I have seen a British ship in New York harbor with an off-color crew, of such mein that five traveled men, one a ship captain, could'nt even guess their nationality. The one making the best guess suggested they might be Malays or something of the kind. They were half clothed, although the weather was cold enough to make overcoats exceedingly comfortable, and looked as though they might live on horse teed, say bran-mash. From such ships and crews "O! congress give us protection!" should be the prayer of every American.

Surely the time is ripe for giving American shipping a helping hand, and can it be better done than by making foreign shipping lend the hand? Such a course would please both seamen and "land lubbers," as the former would be directly benefited while the latter would not be compelled to pay a direct tax for something they are not directly interested in. The fellow—as before stated—to walk the floor would be the foreigner. [Very probably the writer of the foregoing communication does not know of the diffculties that stand in the way of discriminating duties on account of our treaty relations with the nations of the world.—Ed.

New York, Dec. 8, 1902.

The navy department is to make another attempt to make a serviceable craft of the unlucky torpedo destroyer Goldsborough, which has broken down on every trial trip. She has been hauled out of the water at the navy yard and new engines will be placed in her.

CORRESPONDENCE ON SHIP SUBSIDIES.

The Merchants' Association of New York has recently been engaged in a somewhat lengthy correspondence with Leslie M. Shaw, secretary of the treasury, in regard to the secretary's utterance upon the subject of ship subsidy in a speech delivered at Detroit on Oct. 18 last. The association took exception to Mr. Shaw's apparent advocacy of a measure "based upon the aid it would have given to the foreign commerce of the country" and stated to him its belief that "any aid extended to shipping, *per se*, might directly or remotely attach to any proportion of foreign-built ships would so far from aiding commerce, injure it. In reply to this Mr. Shaw wrote that he did not commit himself to any particular ship subsidy bill, but spoke only in favor of non-partisan action. He pointed out that he did not believe that the American people could successfully invade South American and South African markets through foreign bottoms, and said that the bill which passed the senate would have been much stronger had it provided "special inducements for lines reaching to the southward." A second letter from the Merchants' Association cautioned the secretary against the possible belief that the extent of the country's trade with South America or South Africa "is at all affected by the transportation facilities under our own flag." The correspondence is in part as follows:

Hon. Leslie M. Shaw, Secretary of the Treasury, Washington, D. C. Dear Sir.—From your remarks at Detroit, Oct. 18, we gather that your advocacy of a ship subsidy measure is based upon the aid it would give to the foreign commerce of the country. The Merchants' Association of New York has made a careful study of this subject and has brought its views to the attention of the last two terms of congress, which considered subsidy legislation; and while we are in favor of aid being extended to the ship building industry of the United States, we showed that any aid extended to shipping *per se* that might directly or remotely attach to any proportion of foreign-built ships would, so far from aiding commerce, injure it. The bill introduced in the first session of the fifty-sixth congress was prepared by a group of men for the most part ship owners themselves, and for a large part the owners of foreign tonnage, and it was ingeniously framed to advocate special legislation in their favor. It was, nevertheless urged upon congress, by influential senators, as not only the best, but the only form in which a subsidy was practicable. We contested this position vigorously, and when the subject came up in the following session of congress our representation had apparently carried conviction, for we received a communication from the sponsor of the bill in the senate to inform us that a clause had been adopted absolutely excluding foreign tonnage from any benefit through the bill, and reaffirming the law which excludes foreign tonnage from registration in the United States. It [the bill] authorized and directed the postmaster-general to contract with American-built ships for the carriage of the mails, providing a liberal subsidy therefor, but at the present time the steamers of American construction are insufficient to perform this service, and the result would be the suspension thereof on the most important routes until either tonnage was constructed (a matter of years), or an amendment of the law procured that would violate its proposed terms. It is idle to enact legislation that invokes impossible conditions and necessitates the demand for a speedy amendment, so we suggested that the directions to the postmaster-general should become mandatory only in so far and so soon as a sufficient American tonnage made them possible of accomplishment, and discretionary in the meantime, *i. e.*, leaving him free to continue the present efficient service until conditions permitted the change contemplated. Failing such an amendment as we suggested, it is evident that the provision for the postal service would provoke special or class legislation favoring a group of Americans who have procured the so-called shipping trust or combine. They now control a large proportion of the transatlantic liners available for mail service, and an act of congress for which precedent could be cited to give them American registry for the vast fleet of tonnage in their control would appear to solve the problem, but instead of a subsidy going to encourage ship building at home it would go for its largest part to the product of foreign ship yards and clearly encourage ship building abroad, putting an embargo on the home industry. Our foreign commerce does not require adventitious aid, although the encouragement of a direct mail service to certain important markets and the incidental freighting facilities it would afford may well be considered in a subsidy scheme. You call attention to the vast growth of our foreign trade contemporaneous with the decline of our shipping, which conclusively shows that the one does not depend upon the other. It is a mistake to believe that our exports to South American countries are shipped via Europe. Every important South American market is served by one or more direct lines of steamers from New York and other United States ports. The comparison made in your remarks as between the benefit derived by the country from the transcontinental railways cannot apply to the introduction of American steamships into the foreign trade already provided with transportation. In the one case development waited upon transportation, whereas in the other adequate transportation is already provided. It would certainly be of advantage to introduce a better class of tonnage capable of a mail service. This is a deficiency in the present status, and it is true that our mails to some of the South American States depend upon service via Europe.

Very respectfully,

(Signed)

G. L. Duval,
Wm. R. Corwine,
Committee on ship subsidies, the Merchants' Association of New York.

To the foregoing communication Secretary Shaw replied as follows:

Treasury Department,
Office of the Secretary,
Washington, Nov. 8, 1902.

Gentlemen: Your letter of Oct. 29 awaits my arrival. If you will re-read my Detroit speech you will observe that I did not commit myself in favor of any particular ship subsidy bill. I simply spoke in favor of non-partisan action, if possible, for the building up of a merchant marine. I quote a few sentences from the Detroit speech:

"A ship subsidy bill has passed the senate. I am not speaking in favor of it. So, without discussing the merits of the bill now pending, I want to urge the importance of a bill constructed upon very different lines; one that shall insure regular steamship connection with South American countries, South African countries, and the adjacent islands. It is idle to suppose that steamship lines will be established to those ports without government aid. There is little freight now to carry, and no inducement. Any steamship line would perish before sufficient trade could be built up to make it profitable. It took long years to establish sufficient transatlantic commerce to make our Pacific lines of railway profitable. It will take perhaps longer still to make steamship lines to those ports far to the southward profitable."

Others may be satisfied with furnishing 10 per cent. of the import trade of South America and the Pacific ocean countries. I am not. And I am abidingly of the opinion that it will require a very much larger relative subsidy to encourage lines of steamers to countries where we have little mail and less freight than to insure competition in transatlantic commerce. I think your association will agree with me that the most important question before the American people to-day is more markets. It will take twenty-five years, under the most favorable conditions, to work up a respectable trade in South America, South Africa, and the adjacent islands. Some may believe we can successfully invade these markets through foreign bottoms, first to Europe, and thence to ports of destination, notwithstanding the uniform discrimination now practised against us, but I do not share the delusion. Personally, I believe the bill that passed the senate would have been much stronger had it provided special inducements for lines reaching to the southward.

Very truly yours,

(Signed) L. M. Shaw.

The next letter of the Merchants' Association to Mr. Shaw was dated Nov. 17 and was in substance as follows:

From an attentive reading of your Detroit speech we were aware in addressing you that you did not speak in advocacy of any specific measure, although it was a fair inference that you found no objection to the subsidy bill that recently passed the senate. We understood, moreover that you spoke in the belief that a subsidy bill was essential to the development of our foreign commerce, and that our commerce with South American countries was now largely conducted via Europe, and our chief pupose in addressing you was to correct these impressions. It is a matter of public notoriety that the interests that would benefit most largely by the bill as originally proposed to the fifty-sixth congress have enormously increased their holdings of foreign tonnage, and in a recent public utterance one of the gentlemen most prominently identified with those interests has declared, in discussing the shipping bill, that it should be possible that tonnage owned by Americans could sail under the American flag. We are accordingly justified in urging that extraordinary precautions be taken against the creation of conditions that would give to that or any group of Americans the right or the opportunity to exact special privileges. We favor, as you will see, a graduated subsidy—a maximum for tonnage serviceable in the first degree for government use in time of need; somewhat less for tonnage suitable to mail service and available in the secondary degree to the government in time of need; and a moderate subsidy to offset existing conditions in favor of foreign ship yards for the ordinary steamer of commerce. This last we advocate not in behalf of commerce, but because ship yards cannot be maintained by orders exclusively for the higher grade of tonnage. We trust you will excuse us for cautioning you against the possible belief that the extent of our trade with South America or South Africa is at all affected by the transportation facilities under our own flag. There are many and far more vital reasons why we are restricted in supplying but a small percentage of the requirements of those countries."

To this last letter Secretary Shaw replied as follows under date of Nov. 28:

"Probably two-thirds of the discussions in this world are among people who practically agree, except in forms of expression. Not until the friends of additional financial legislation shall at least attempt to agree among themselves will there be any further legislation on the subject, and I presume the same rule applies with reference to the friends of a ship subsidy. There are enough opponents to all subsidies to defeat any bill. if they can secure reinforcements from among the friends of ship subsidy who do not agree on the details of legislation proposed."

MONTHLY SUMMARY OF NAVAL CONSTRUCTION.

The monthly summary of naval construction, issued by the bureau of construction and repair, shows slow but steady progress. The submarines are all practically complete in a structural sense. The armored cruisers are forging ahead steadily and there is a steady diminution in the list of torpedo boats. One by one they are being accepted. Following is the summary:

Name.	Building at	Degree of completion. Per Cent. Nov. 1.	Dec. 1.
Battleships.			
Maine.....	Cramp & Sons	98	98
Missouri.....	Newport News Co.	76	79
Ohio.....	Union Iron Works	64	67
Virginia.....	Newport News Co.	9	11
Nebraska.....	Moran Bros. Co.	10	12
Georgia.....	Bath Iron Works	16	16
New Jersey.....	Fore River Ship & Engine Co.	18	21
Rhode Island....	Fore River Ship & Engine Co.	18	21
Connecticut.....	Navy Yard, New York	0	1
Louisiana.....	Newport News Co.	0	0
Armored Cruisers.			
Pennsylvania....	Cramp & Sons	34	38
West Virginia...	Newport News Co.	39	41
California.....	Union Iron Works	14	15
Colorado.....	Cramp & Sons	38	41
Maryland.....	Newport News Co.	37	39
South Dakota...	Union Iron Works	12	14
Protected Cruisers.			
Denver.....	Neafie & Levy	85	85
Des Moines.....	Fore River Ship & Engine Co.	75	77
Chattanooga.....	Lewis Nixon	68	68
Galveston.....	Wm. R. Trigg Co.	65	66
Tacoma.....	Union Iron Works	55	57
Cleveland.....	Bath Iron Works	89	90
St. Louis.....	Neafie & Levy	9	11
Milwaukee.....	Union Iron Works	6	6
Charleston.....	Newport News Co.	18	20
Monitors.			
Nevada.....	Bath Iron Works	98	99
Florida.....	Lewis Nixon	95	95
Torpedo Boat Destroyers.			
Hopkins.....	Harlan & Hollingsworth	95	95
Hull.....	Harlan & Hollingsworth	95	96
Lawrence.....	Fore River Ship & Engine Co.	99	99
McDonough.....	Fore River Ship & Engine Co.	98	99
Torpedo Boats.			
Stringham.....	Harlan & Hollingsworth	98	98
Goldsborough...	Wolff & Zwicker	99	99
Blakely.....	Geo. Lawlev & Son	99	99
Nicholson.....	Lewis Nixon	98	98
O'Brien.....	Lewis Nixon	98	98
Tingey.....	Columbian Iron Works	75	77
Submarine Torpedo Boats.			
Plunger.....	Lewis Nixon	98	99
Grampus.....	Union Iron Works	89	90
Pike.....	Union Iron Works	81	82
Porpoise.....	Lewis Nixon	98	99
Shark.....	Lewis Nixon	98	98
Steel Tugs.			
Steel Tug.....	Navy Yard, Boston	0	2
Steel Tug.....	Navy Yard, Mare Island	0	0

BRITISH LAW MAKERS OPPOSED TO SUBSIDIES.

A brief summary of the report of the select committee of the house of commons on steamship subsidies comes by cable from London. The general tenor of the report is against the principle of subsidies.

The committee finds that British ship owners have not suffered much from the fostering effects of subsidies paid by foreign governments; that subsidies are merely minor factors, and that commercial skill and industry were the major factors in the recent development of the shipping and trade of certain foreign countries, notably Germany. It is also found by the committee that subsidies restrict free competition and facilitate the establishment of federations and shipping rings and that therefore a general system of subsidies, except for services rendered, and without government control of the maximum rates on freights, is costly and inexpedient. In rare cases subsidies may be desirable, but the committee declares the conditions must include adequate speed and forbid the sale or hire of any subsidized ship without the permission of the government. The committee considers that in order to give British ship owners a fair show against their foreign rivals, the board of trade regulations should be enforced against foreign equally with British ships; that all light dues should be abolished, the cost being defrayed by the nation, and that means should be adopted to secure the removal of regulations by which British ship owners are excluded from the coasting trade of foreign countries. The committee suggests that regulations should be imposed on foreign vessels participating in the British and colonial trade of the empire, as a means for securing reciprocal advantages for British ship owners abroad.

The committee discusses at some length the effect on British trade of the transfer of merchant vessels to foreign ownership and enumerates the British lines sold to Americans, including the Morgan syndicate, and to Germans. Dealing with the Morgan transfer the report says: "If the American railway management unites with the steamship management a very influential undertaking may perhaps be formed, but too many interests are often involved to make such combinations quite as powerful as they might be supposed to be. It remains, however, quite certain that the transfer of British ships to foreign flags, whether owning foreign subsidies or otherwise may cause serious results, such as developing new trades in which British shipowners, without government backing, cannot engage, and the substitution of foreign officers and crews for British."

SAGINAW LUMBER BUSINESS.

Navigation is practically closed on the Saginaw river, so far as regards the lumber trade. The river commerce has been reversed in the last twenty years. Up to 1890 the lumber manufactured on this river was sent out by cargoes on boats, the high water mark being reached in 1882, when there was sent out over 858,000,000 ft. Then no lumber came into the river by boat. When the pine timber became exhausted in this district, lumber dealers engaged in handling lumber by rail began to look elsewhere for lumber and instead of shipping lumber out by water, now it is being brought in. During the season just closed there came into the river 160,247,059 ft. of lumber, 35,679,156 ft. being reported at the Saginaw customs house and 124,567,903 ft. at Bay City. There also came into the river 2,082,410 pickets, 10,620 cedar posts and 1,610,000 ft. of logs from Michigan ports. Two rafts of logs came from Canada. There was also received 22,526,851 pieces of lath. The lumber receipts exceed those of last year by 50,000,000 ft. and are the largest since the business of bringing in lumber by water was inaugurated. The lumber shipments by water are insignificant, only 3,268,000 ft. having been shipped during the last season, a decline of over 855,000,000 ft. in twenty years. The railroads now do the shipping business, handling approximately 350,000,000 ft. the present year. There was shipped by water one raft of 2,000,000 ft. of logs.

STRATEGY OF LIGHTHOUSE ENGINEER.

The lighthouse board has turned down the proposition to transfer the harbors of Mackinaw and Sheboygan from the eleventh to the ninth district. Just why the application for the transfer was made is an interesting story. Inspectors while on duty are presumed to roam within their own balliwicks, and as the eleventh district contains numerous summer resorts the inspectors assigned there have no temptations to encroach on their neighbors. Mackinaw is the dividing line between the ninth and eleventh districts, and for years inspectors in the former have been cursing the fate which prohibited them from enjoying the delights of Mackinac island, which is the fashionable resort on the great lakes. When Com'dr. Lucien Young took command of the ninth district, he found that his boats wintered at Cheboygan harbor, which is in the eleventh district, so he made application to have the boundary of the district changed, on the ground that the boats should be wintered within the district. As soon as he heard of it Com'dr. Herbert Winslow of the eleventh exposed the real reason for the much wanted change, with the result that the application has been denied after considerable discussion. The matter has created considerable amusement among naval officers, and Com'dr. Young is being twitted over the fact that his strategic movement to capture Mackinac island failed, and that he will be obliged to content himself with seeking diversion along the Chicago river.

The yawl boat of the steamer Sylvanus J. Macy, lost off Long Point, was picked up by the steamer Livingstone and delivered at Detroit last week when she stopped for coal. Capt. William McAlpine of the Livingstone reports having picked up the yawl 20 miles west of Long point, on the Buffalo course. The belief that the crew of fourteen persons who were lost on the Macy did not have time to leave the steamer and probably went down with her, has been proved incorrect. The crew must certainly have lost their lives in the open small boat as, when it was found, although bottom-side up, it showed signs of having been occupied, and all but one of the thole-pins were broken off close to the bulwarks. No oars were found. Capt. McAlpine of the Livingstone says the captain of the steamer Luzon reported to him having passed a body lashed to one of

the Macy's life preservers, but on account of the high seas running at the time it was out of the question to pick it up. Capt. George King, who was commissioned by Herman C. Ralph, for the Macy's owners, to make the trip along the north shore of Lake Erie between Port Burwell and Long point, returned to Detroit, after an unsuccessful effort to recover some of the lost bodies. He found the cabin of the Macy on the shore 14 miles below Port Burwell and 2 miles back from the lake. It had been carried there by farmers. Other wreckage was discovered along the beach.

The Cleveland Cliffs Iron Co. is about to install an electric power distribution system for operating mixers and blowers in its Gladstone, Mich., plant. They have recently purchased from the Westinghouse Electric & Mfg. Co. two 75-K.W. direct-current generators and eight 10-H.P. direct-current motors. The Pioneer Iron Works of Marquette, Mich., owned by the Cleveland Cliffs Co., will also be equipped with electrical apparatus, which will be used for the operation of mixers and blowers, as in the Gladstone plant. Apparatus recently purchased from the Westinghouse Electric & Mfg. Co. for the Marquette plant includes ten 10-H.P. direct-current motors and two 150-K.W. engine-type generators to be direct connected to two Westinghouse compound condensing engines. The company has also ordered a Baldwin-Westinghouse electric locomotive to be used for shifting cars in its yards.

Hon. Perry Belmont, who recently sold his auxiliary steam yacht Satanella to Mr. M. J. Lawrence of Cleveland, and which has left for a southern cruise with her new owner on board, has commissioned Messrs. Gardner & Cox, naval architects of No. 1 Broadway, New York, to look up for him a boat of about the same size as the Satanella, possessing more speed. Mr. Belmont's reason for selling the Satanella was primarily that the boat was too slow for his use between New York and Newport, and as his many business enterprises make it necessary for him to visit New York frequently during the yachting season, he desires a boat of good speed to utilize in this service.

Wrecking Master Harris W. Baker of Detroit is figuring upon taking a boat and pumps to the scene of the steamer C. B. Lockwood, sunk off Ashtabula, O., and recover the grain cargo which went down with the boat. A diver has returned after making an examination and reports the Lockwood's decks out but the cargo all there and deep enough down so that the action of the water will not carry it away. During cold weather the grain could be pumped out and this Capt. Baker says he will do if the weather moderates sufficiently to allow a boat to work above the wreck.

PNEUMATIC RIVETING MACHINES.

The John F. Allen Riveting Machine Works, 370-372 Gerard avenue, New York, on Dec. 1, delivered to the United States navy yard at Brewerton, Wash., one of their large-type jaw riveters. A similar riveter is also in use at the navy yard at Portsmouth, as well as in the works of the New York Ship Building Co., Camden, N. J., and the Wm. R. Trigg Co., Richmond, Va.

The Allen works manufacture pneumatic riveters for all manner of heavy and light work and already there are some 900 of them in operation throughout the United States, Canada and Europe. The various sizes, styles, etc., are fully illustrated and explained in their catalogue, which is sent free on application.

The first rural free delivery marine route ever established by the post office department has just completed its first season. It is on Lake Winnipesanker, the largest of New Hampshire lakes. During the summer time hundreds of people congregate there and a long time had to go from 10 to 12 miles for their mail. Now the mail is taken from the Lakeport office on the Dolphin, a steamer constructed for the purpose, and is delivered to the cottages along the shore. The steamer was constructed for this purpose by Dr. G. H. Saltmarsh of Laconia.

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TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

TRADE NOTES.

Nearly fifteen hundred boilers of the Roberts type have been built to date by the Roberts Safety Water-Tube Boiler Co.

The Cambridge Electric Light Co. of Cambridge, Mass., has decided to displace the direct-current power distribution system at present installed by an alternating-current system. This action is being taken after a long and exhaustive investigation into the comparative merits of the various types of direct and alternating current motor apparatus now upon the market, made by the electrician of the company, Mr. W. R. Eaton. The company has recently purchased from the Westinghouse Electric & Mfg. Co. ninety-nine induction motors, which will take care of the bulk of the power service, comprising every possible use of electric power in a city of this kind, from public works to small tailoring establishments. The order comprises: Eleven motors of 1 H. P.; twenty-six motors of 2 H. P.; nine motors of 3 H. P.; nineteen motors of 5 H. P.; twenty-five motors of 7½ H. P.; and nine motors of 15 H. P.

Writing of the use of Smooth-on in foundry work one of the officials of the Smooth-On Mfg. Co., 547-49 Communipaw avenue, Jersey City, N. J., says: "In ordinary foundry practice many iron castings are rejected which could as well be saved. Their strength is not effected by blemishes. The only reason for dumping them on the scrap heap is their appearance. Smooth-on is not a mere filling. It is a dry, metallic composition, which, upon being mixed with water, becomes a hard metallic iron that is insoluble in water, petroleum or other oils, that will stand an intense heat. As the expansion is the same as iron, it is sometimes called 'magic iron.' When applied to a blemish in a casting by a skilled mechanic, the blemish is removed."

The Chicago Pneumatic Tool Co. is mailing to the trade a four-page circular, designated as special circular No. 32, attractively designed in black and red on enamel paper, illustrating the Tynan patent annealer and the Tynan rivet heating forge. The company has secured the entire control of these devices and will be the exclusive manufacturers of them in the future. The annealer and rivet forge fit in very nicely with the line of pneumatic appliances which the Chicago company manufacture, as they are operated by compresed air, using crude oil as a fuel. They are designed for the various classes of repair work incident to ship yards, railroad shops, etc. Both machines are light in weight and therefore easily moved from place to place, an important feature in the class of work for which they are adapted. The circular contains illustrations of the machines at work in the Cramp ship yard, Philadelphia, the Newport News works and other ship yards.

Mr. W. D. McPherson, admiralty lawyer of Toronto, made an interesting motion before Judge McDougall of that city, a few days ago, on behalf of the owners of the steamer D. C. Whitney. The Whitney is alleged to have collided some months ago at Sandusky with the Monguagon, owned by the St. Clair Navigation Co. Although the collision took place in American waters between ships of American register, yet the Whitney was seized a short time ago in Canadian waters and held until bail was put in. After hearing argument the judge held that this was a case where the complainants, being resident out of the jurisdiction of the court, should give the defendants security for the costs they might incur in defending the proceedings in Canada, and ordered security to the extent of $800, and staved all pending proceedings until the order is complied with. This is said to be the first case in Canada where security for costs has been ordered in the admiralty court. It is understood that the defendants will dispute the jurisdiction of the Canadian court under the circumstances.

The navy department has under consideration the question of revoking the contract of the Atlantic, Gulf & Pacific Co. of New York to construct a dry dock at the League Island navy yard. The company recently applied to the department for a year's extension of time. Rear Admiral Endicott, chief of the bureau of yards and docks, recommended that the action be not granted. The assistant secretary of the navy has written to Secretary Moody recommending that the contract be revoked.

The ferry boat Winthrop, which sailed from Boston about two weeks ago for Jacksonville, has put in at Newport News for coal and repairs. The Winthrop was sold to Jacksonville parties and started out to make the trip down the coast under her own steam in order to save towing expenses. She was roughly handled in a storm and had to put in at New York for four days. Repairs became necessary again and the coal supply was short, so the Winthrop had to make a second stop at Newport News.

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Editor Marine Review:—During the coal strike barges, square-riggers, tugs, steamers and multi-masted schooners were at anchor in Boston's lower harbor, their crews discharged, each vessel only retaining a solitary watchman, the personification of grim responsibility, and whose failure to swell the ranks of the army of unemployed seamen was due to the demand of some marine insurance company. The ending, if not settling of the coal strike terminated the watchman's monotonous pacing along deserted decks, for the vessel got a charter, which is a nautical term to inform sailors that the ship owner consents to their earning a living. Visiting the shipping offices at the time when the demand for sailors was greater than the supply, I observed that the American-born seaman was conspicuous by his absence. Though "Olaf Bjornson" declared his hailing port to be Philadelphia, and "Yon Yonson" assured me to have first opened his azure blue eyes on the beautiful scenery of the great lakes, I have positive proof that three-fourths of the cradles once containing the infant forms of the American deep-water vessels' present crews, were rocked in another land than that over which the stars and stripes wave. The most unpatriotic American does not suppose that the raw material for the manufacture of mariners is an unknown quantity in his country, but captains and shipowners, finding it more convenient to acquire the finished article, do not trouble themselves with teaching the young American how to knot, reef and steer. No foreign ship, be it a blunt-nosed Baltic trader, or a former American tea clipper, is permitted to leave port without her by-law-regulated complement of boys, and it is this rule, strictly adhered to, that enables the land of the midnight sun to supply the demand for American sailors. I have now attained to the dignity of an ancient mariner. Commencing as boy on board a Dutch "kofschip," I rounded Cape Horn with a German bark, visited India under the French flag, and at last, shipping on a vessel flying the stars and stripes, I was, while agreeably surprised at the quality of the food supplied, and the quantity of wages offered, astonished to observe that among a crew of fourteen beings, in various stages of efficiency, not one could be found whom the accident of birth had made an American..

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Boston, Mass., Dec. 1, 1902. FRANK HANSON.

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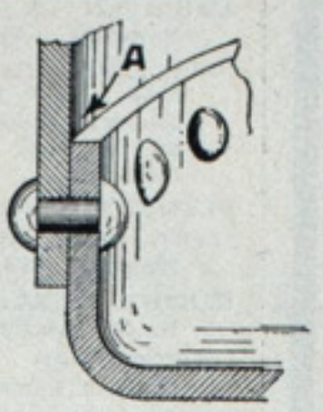

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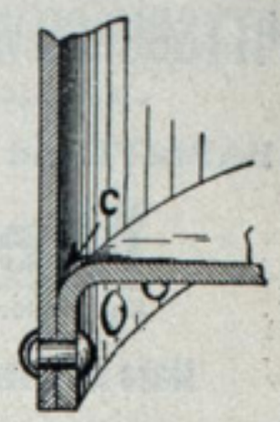

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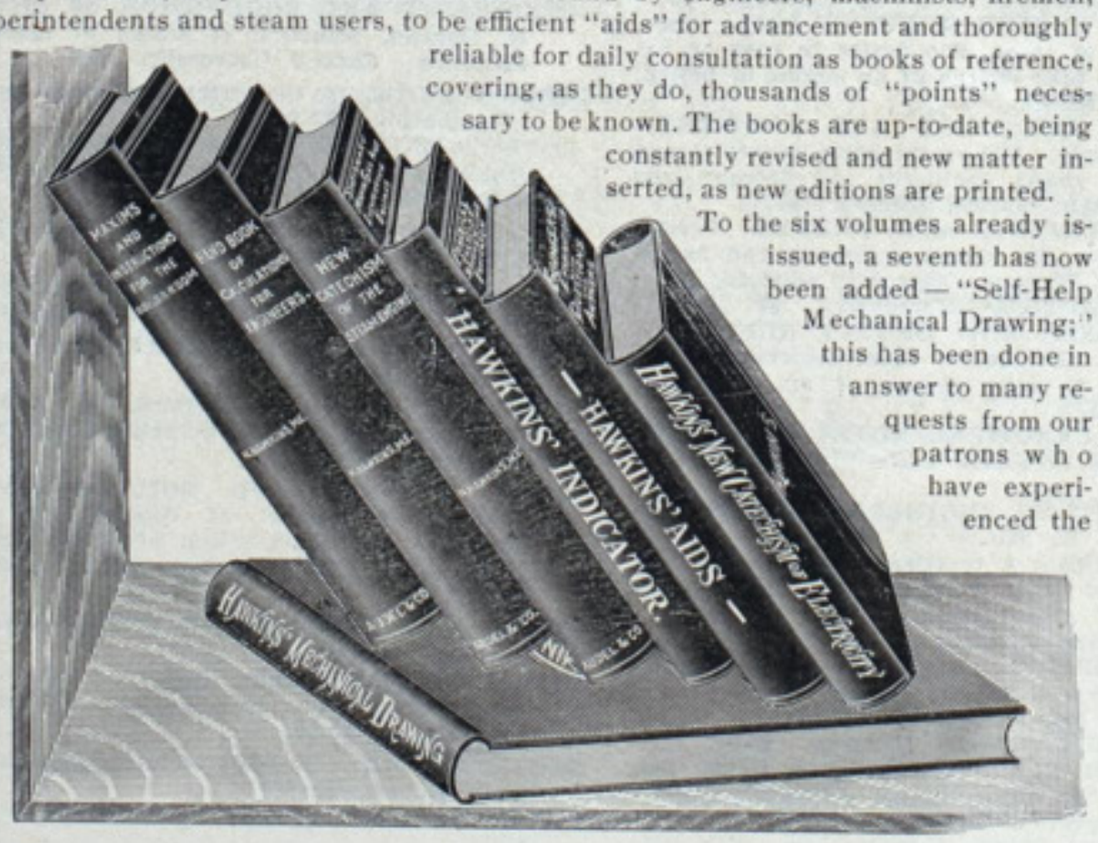

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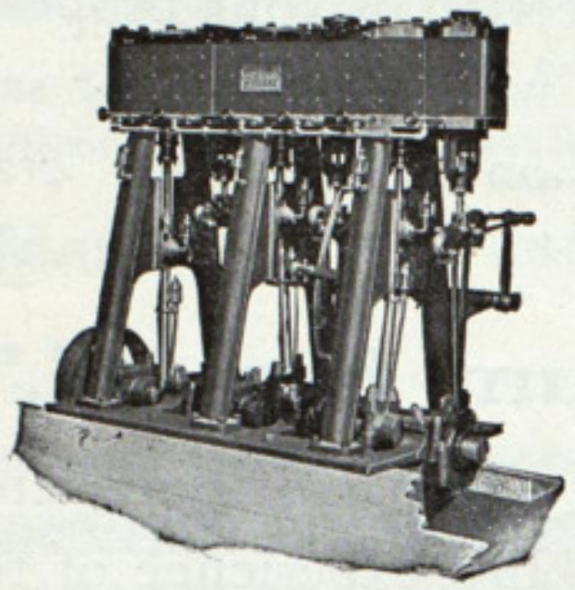

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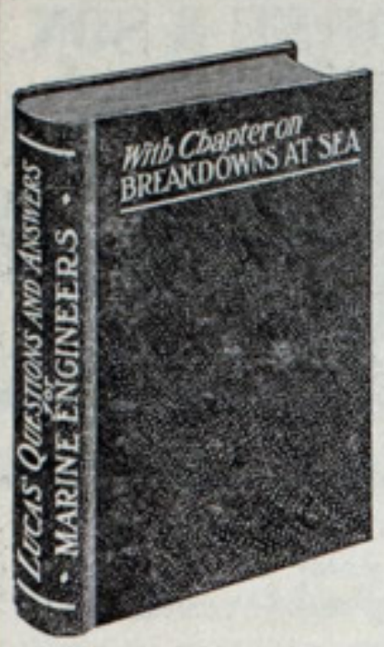

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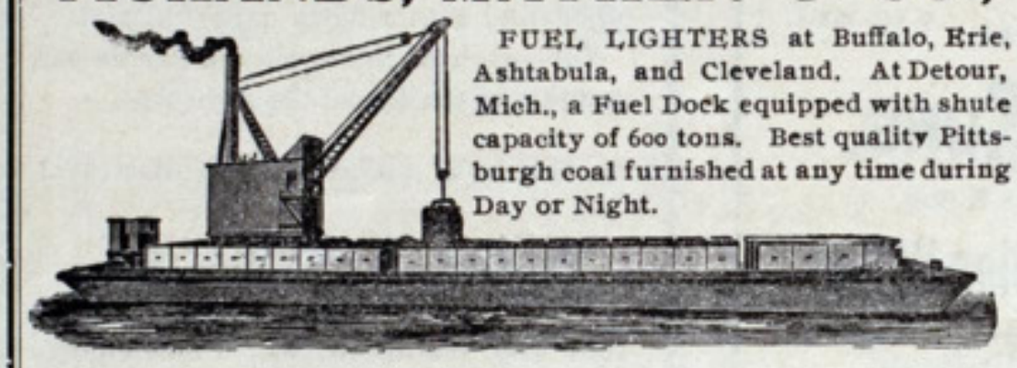

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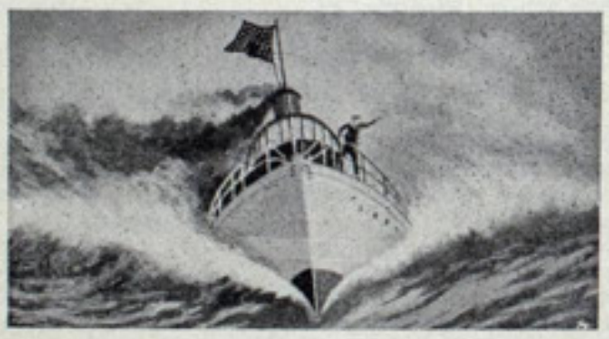

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U S. Engineer Office, Montgomery, Ala., Nov. 10, 1902 Sealed proposals for the construction or sale of one towboat, construction of two barges, one suction dredge, and two dump scows, or for either item of above, will be received here until Dec. 16, 1902 (noon), and then ublicly opened. All information furnished on application. R R RAYMOND, 1st Lieut., Engineers. Dec 11

U. S. Engineer Office, Milwaukee, Wis., Nov 17, 1902. Seal d proposa s for construction of concrete superstructure on breakwater and on north harbor pier, at Milwaukee Harbor, Wis., will be received at this office until 12 n on, Dec. 18, 1902, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. J G. WARREN, Major, Engrs. Dec. 11.

U. S. Engineer Office, Montgomery, Ala., Nov. 10, 1902. Sealed proposals for building snagboat and barge will be received here until Dec. 16, 1902. (noon) and then publicly opened. All information furnished on application. R. R. RAYMOND, 1st Lieut., Engineers. Dec 11

U. S Engineer Office, Duluth, Minn., Nov. 15, 1902. Sealed proposals for furnishing 65,000 barrels Portland cement for South Pier, Superior Entry, Wis., will be received here until noon Dec. 15, 1902, and then publicly opened. Information furnished on application. D. D. GAILLARD, Capt., Engrs. Dec 11

OFFICE CHIEF OF ENGINEERS, U. S. Army, Washington, D. C., Nov. 26, 1902. Sealed proposals for bnilding steel hull, furnishing and installing pumping an i propelling machinery for suction dredge, and for ponton pipe line, will be received here until 2 p m., Jan. 15, 1903 and then opened. Information furnished on application. MASON M. PATRICK, Capt.. Engrs. Jan 8.

U S. Engineer Office, Milwaukee, Wis , Nov. 24, 1902. Sealed proposals for the purchase of U. S. Dredge No. 2 and steam tug "Energy", will be received at this office until 12 noon, Dec. 15, 1902, and then publicly opened. Form for proposal and all information will be furnished on application to this office. J. G. WARREN, Major. En rs. Dec. 11.

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Farran Brass Works.....Cleveland.

HYDRAULIC MACHINERY.

Watson-Stillman Co., The.....New York.
Wood & Co., R. D. .....Philadelphia.

ICE MACHINERY.

American Linde Refrigerating Co. .....New York.
Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.

INJECTORS.

Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co. .....Cincinnati.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Brown, W. W. .....Cleveland.
Dunham, R. J. .....Chicago.
Elphicke, C. W. & Co. .....Chicago.
Hawgood & Co., W. A. .....Cleveland.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. E. & W. F. ...New York and Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
Weeks, F. H. .....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Gas Engine & Power Co. .....New York.
Marine Construction & D. D. Co, Mariner's Harbor,..... S. I. N. Y.
Marine Iron Works.....Chicago.
Warrington Iron Works .....Chicago.
Willard, Chas. P. .....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & D. D. Co, Mariner's Harbor,.....S. I. N. Y.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J.....New York.
Page Bros. & Co. .....Boston.
Russell & Watson .....Buffalo.

LOGS.

Walker & Sons, Thomas .....Birmingham, Eng.
Nicholson Ship Log Co. .....Cleveland.
Also Ship Chandlers.

MACHINISTS.

Chase Machine Co.....Cleveland.
Macbeth Iron Co. .....Cleveland.
Union Machine & Boiler Co. .....Cleveland.
Ward Machine Co.,..... Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.
Fay & Egan Co., J. A. .....Cincinnati.

MAN-HOLES, SWING DOORS, ETC.

"Long-Arm" System Co. .....Cleveland.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co. .....Cleveland
Bloomsburg & Co., H. .....Baltimore, Md.
Buffalo Forge Co. .....Buffalo.
Detroit Ship Building Co. .....Detroit
Steam Boiler Equipment Co. .....New York.
Sturtevant, B. F. Co. .....Boston.

METALLIC PACKING.

Allen, Joseph .....Collingswood, N. J.
Bestosking Packing & Supply Co. .....Boston.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co. .....Boston.

MOTORS, GENERATORS—ELECTRIC.

Buffalo Forge Co, ...Buffalo.
Electro-Dynamic Co. .....Philadelphia.
Elwell-Parker Electric Co. .....Cleveland.
Fort Wayne Electric Works .....Fort Wayne, Ind.
General Electric Co. .....Schenectady, N. Y.
"Long-Arm" System Co. .....Cleveland.
Seidler-Miner Electric Co. .....Detroit.
Sturtevant, B. F. Co. .....Boston.
United Marine Mfg & Supply Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Goodenough, Walter .....New York.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Mosher, Chas. D. .....New York.
Newman, R. L.....New York.
Sadler, Perkins & Field, ...New York.
See, Horace.....New York.
Wood, W. J. .....Chicago.

NAVAL STORES.

Day, Britton T. & S. P. Day.....Cleveland.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co.,.....Jersey City, N. J.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.

OIL FILTERS.

Haines Co., W. S. .....Philadelphia.

PACKING.

Allen, Joseph .....Collingswood, N. J.
Bestosking Packing & Supply Co. .....Boston.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
United States Metallic Packing Co. ....Philadelphia.

PAINTS.

Baker, Howard H. & Co .....Buffalo.
Berry Bros., Ltd. .....Detroit.
Day's Varnish & Dryer Co. .....Cleveland.
Mohawk Paint & Chemical Co. .....New York.
New Jersey Zinc Co. .....New York.
Topky Brothers,.....Ashtabula.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.
Fay & Egan Co., J. A. .....Cincinnati.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.

Waterbury Brass Co.....New York.

PIPE, WROUGHT IRON.

Bourne-Fuller Co .....Cleveland.
Crane Co .....Chicago.

PIPE, CAST IRON.

Wood & Co., R. D. .....Philadelphia.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.
Fay & Egan Co., J. A. .....Cincinnati.

PLATE BENDING AND PLANING MACHINES.

Wood & Co., R. D. .....Philadelphia.

PLUMBING, MARINE.

Mott, J. L., Iron Works .....New York.
Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son .....New York.

PNEUMATIC TOOLS.

Chicago Pneumatic Tool Co. .....Chicago.
Q. & C. Co. .....Chicago.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

POWER DOORS AND HATCHES.

"Long-Arm" System Co. .....Cleveland.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co. .....Troy, N. Y.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PROPELLER WHEELS.

American Ship Building Co. .....Cleveland
Atlantic Works .....East Boston, Mass.
Baltimore Ship Building & Dry Dock Co. Baltimore.
Bath Iron Works, Ltd. .....Bath, Me.
Cramp, Wm. & Sons .....Philadelphia.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works ..... Detroit.
Hyde Windlass Co. .....Bath, Me.
Harlan & Hollingsworth Co.....Wilmington, Del.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
MacKinnon Mfg. Co. .....Bay City, Mich.
Marine Iron Works .....Chicago.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co...Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Ship Building Co..... ... Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trigg, Wm. R. Co. .....Richmond, Va.
Trout, H. G. .....Buffalo.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. .....Cleveland.
Fort Wayne Electric Works.....Fort Wayne, Ind.
General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co. .....Detroit.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co. .....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
Wood, R. D. & Co. .....Philadelphia.

PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. .....Chicago.
Wood, R. D. & Co. .....Philadelphia.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping.New York.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

RANGES.

Russell & Watson .....Buffalo.

RIVETS—BRASS AND COPPER.

Waterbury Brass Co.....New York.

RUBBER INSULATED WIRES.

Roebling's Sons, Jno. A...New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS—NAUTICAL, ENGINEERING.

Buffalo Com. & Electro-Mechanical Inst...Buffalo.
Chicago Nautical School..... .....Chicago.
Capt. S. W. Gould..... .... Cleveland.

SEARCH LIGHTS.

Elwell-Parker Electric Co. .....Cleveland.
Fort Wayne Electric Works.....Fort Wayne, Ind.
General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co. .....Detroit.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co. .....Cleveland.
Atlantic Works .....East Boston, Mass.
Baltimore Ship Building & Dry Dock Co..Baltimore.
Bath Iron Works, Ltd. .....Bath, Me.
Bell Engineering Works, David .....Buffalo.
Buffalo Dry Dock Co. .....Buffalo.
Cramp, Wm. & Sons .....Philadelphia.
Craig Ship Building Co. .....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works,. .....Detroit.
Harlan & Hollingsworth Co. .....Wilmington, Del.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
Manitowoc Dry Dock Co..... .....Manitowoc Wis.
Marine Construction & Dry Dock Co., Mariner's Harbor,..... ..... S. I. N. Y.
Marine Iron Works .....Chicago.
Maryland Steel Co .....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co....Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Smith & Son, Abram .....Algonac, Mich.
Superior Ship Building Co.....Superior, Wis.
Trigg, Wm. R. Co. .....Richmond, Va.
Warrington Iron Works .....Chicago.
Willard, Chas. P. & Co. .....Chicago.

SHIP CARPENTERS.

Sweeney, Wm. .....Cleveland.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co. .....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J.....New York.
Page Bros. & Co.....New York.
Russell & Watson.....Buffalo.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.
Holmes, Samuel.....New York.
King, Rufus S.....New York.
McCarthy, T. R.....Montreal, Can.
Newman, R. L.....New York.
Weeks, F. H.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
International Nav. Co.....Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line.....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co.....Chester, Pa.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co. .....Cleveland.
Dake Engine Co ....Grand Haven, Mich.
Detroit Shipbuilding Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Queen City Engineering Co.....Buffalo.
Sheriff Mnfg. Co.....Milwaukee.

STOCKS, BONDS, SECURITIES.

Brown, W. W.....Cleveland.
Fahey & Co.....Cleveland.

SUBMARINE DIVING APPARATUS

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Goodenough, Walter.....New York.
Gaskin, Edward.....Buffalo.
Newman, R. L.....New York.
See, Horace.....New York.
Wood, W. J.....Chicago.

TESTS OF MATERIAL.

Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Chicago Pneumatic Tool Co. .....Chicago.
Q. & C. Co.....Chicago.
Watson-Stillman Co.....New York.
Wood, R. D. & Co.....Philadelphia.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.
Fay & Egan Co., J. A.....Cincinnati.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Lake Shore Stone Co.....Milwaukee.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.
Sincennes-McNaughton Line, Ltd....Montreal, Can.

TRAPS, STEAM.

Haines Co., Wm. S.....Philadelphia.
Kieley & Mueller.....New York.

TRUCKS.

Boston & Lockport Block Co..... .....Boston.

TUBING, SEAMLESS.

Benedict & Burnham Mnfg. Co....Waterbury, Conn.
National Tube Co.....Pittsburg.
Waterbury Brass Co.....New York.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co. .....Chicago.
Farnan Brass Works..... ..... Cleveland.
Jenkins Bros.....New York.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Wood & Co., R. D.....Philadelphia.
Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Berry Brothers, Ltd.....Detroit.
Day's Varnish & Dryer Co. .....Cleveland.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Brown, W. W.....Cleveland.
Dunham, R. J..... .....Chicago.
Elwell, Jas. W. & Co.....New York.
Elphicke, C. W & Co.....Chicago.
Hall & Root.....Buffalo.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
King, Rufus S.....New York.
McCarthy, T. R.....Montreal.
Newman, R. L.....New York.
Mitchell & Co.....Cleveland.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H.....New York.

VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co.....Boston.

WIRE—BRASS AND COPPER.

Waterbury Brass Co.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co. .....New York
Roebling's Sons John A....New York and Cleveland.
Upson-Walton Co.....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Farnan Brass Works..... .....Cleveland.
Lunkenheimer Co.....Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co.....New York.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.
Fay & Egan Co., J. A.....Cincinnati.

WRECKING AND SALVAGE COMPANIES.

Cuyahoga Contracting Co.....Cleveland.
Donnelly Salvage & Wrecking Co....Kingston, Ont.
Lake Shore Stone Co.....Milwaukee.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

YACHT SAILS, FITTINGS, HARDWARE, ETC.

Wilson & Silsby.....Boston.

YACHT AND BOAT BUILDERS.

Bell Engineering Works, David .....Buffalo.
Drein, Thos. & Son.....Wilmington, Del.
Gas Engine & Power Co..... New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co. ...New York.
Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co. .....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

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Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

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Sweeney, Wm. 12
Taylor Water Tube Boiler Co... 15
Thropp, J. E. & Sons Co. 37
Thurston & Bates 41
*Topky Bros. 37
Trigg Co., Wm. R. 5
Trout, H. G. 8
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Tunnel City Boiler Works 14
Union Machine & Boiler Co..... 8
United Marine Mfg. & Supply Co...32
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Ward Machine Co..... 35
Warrington Iron Works 10
Waterbury Brass Co..... 48
*Watson-Stillman Co. 47
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Westinghouse Electric & Mfg. Co. 6
White, Johnson, McCaslin & Cannon 40
*Willard, Chas. P. & Co..... 13
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*Wood & Co., R. D. 13
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Eastward.	Arrive from West	Depart East.
.....	.....	1:50am
No. 22, Lake Shore Lim...	*2:15am	*2:20am
No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 44, Ac via Sandusky..	†1:40pm	.. ..
No. 46, Southwestern Ex.	.....	*3:00pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim. ...	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.	†9:10pm	†9 25pm
No. 126, Norwalk Accom.	†7:50am	.....
No. 106, Conneaut Accom	.....	†4:30pm

Westward.	Arrive from East.	Depart West.
No. 25, 20th Cent Lim.....	*2:27am	*2:30am
No. 11, Southwestern Lim	*3:25am	.....
No. 15, Bost & Chi Sp.....	*3:10am	*3:15am
No. 43, Fast Mail	*4:45pm	.....
No. 7, Day Express.	.....	†6:10am
No. 19, Lake Shore Lim..	*7:15am	*7:20am
No. 23, Western Express.	*10:30am	*10:35am
No. 33, Southern Express	*12:25pm	....
No. 133, Cleve & Det Ex..	*11.20am	*12:45pm
No. 47, Accomodation.....	†11.20am	†3:00pm
No. 141, Sandusky Accom.	.....	†3:10pm
No. 127, Norwalk Accom..	.....	†5:10pm
No. 37, Pacific Express...	*7:00pm	*7:20pm
No. 2, Fast Mail Lim.....	*10:50pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

*Daily. †Except Sunday.

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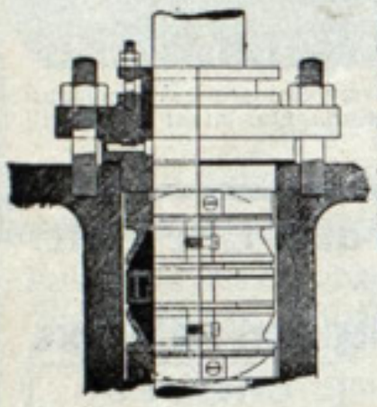

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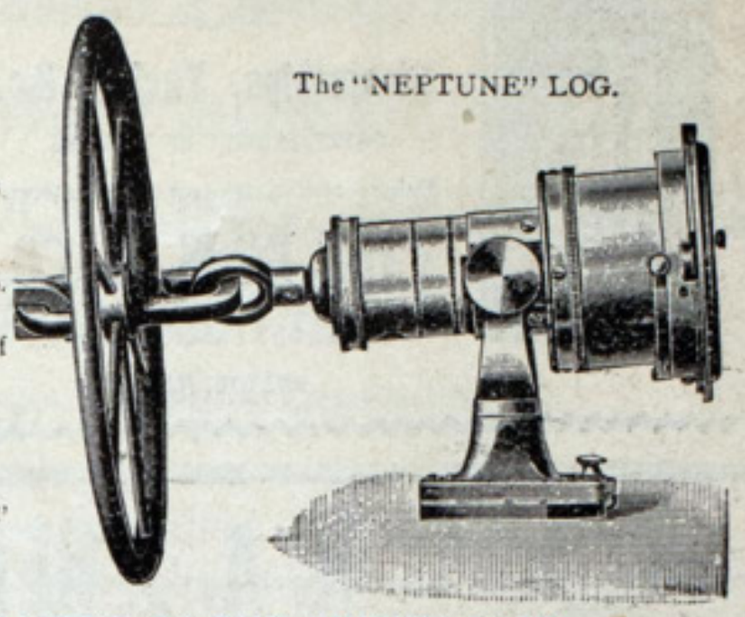

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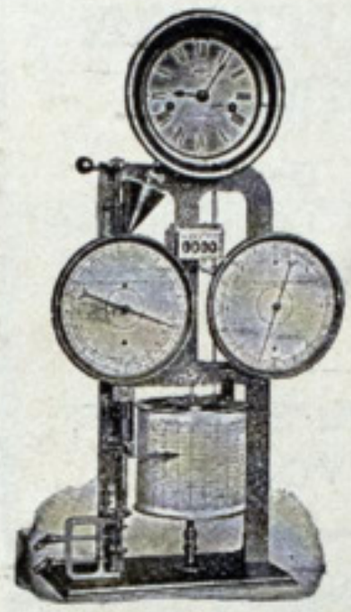

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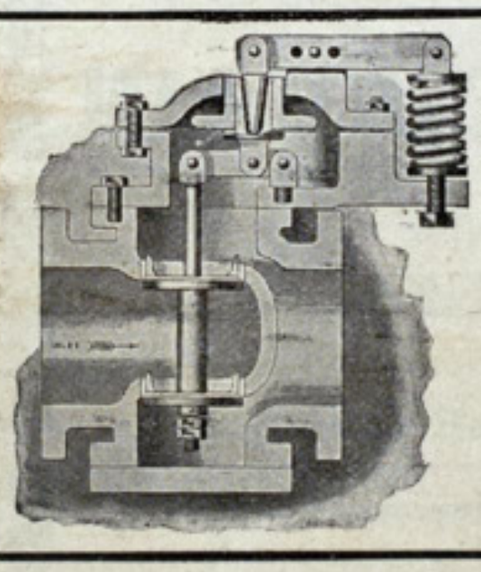

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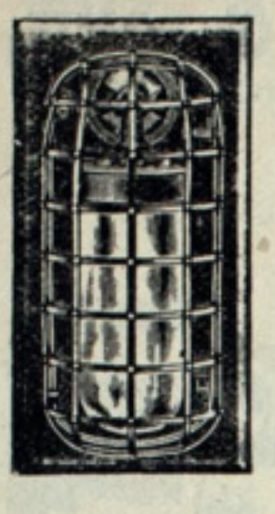

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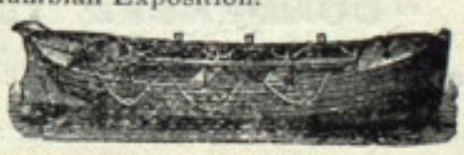

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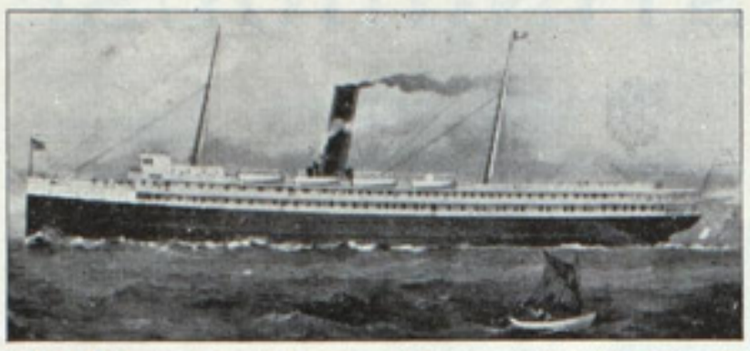

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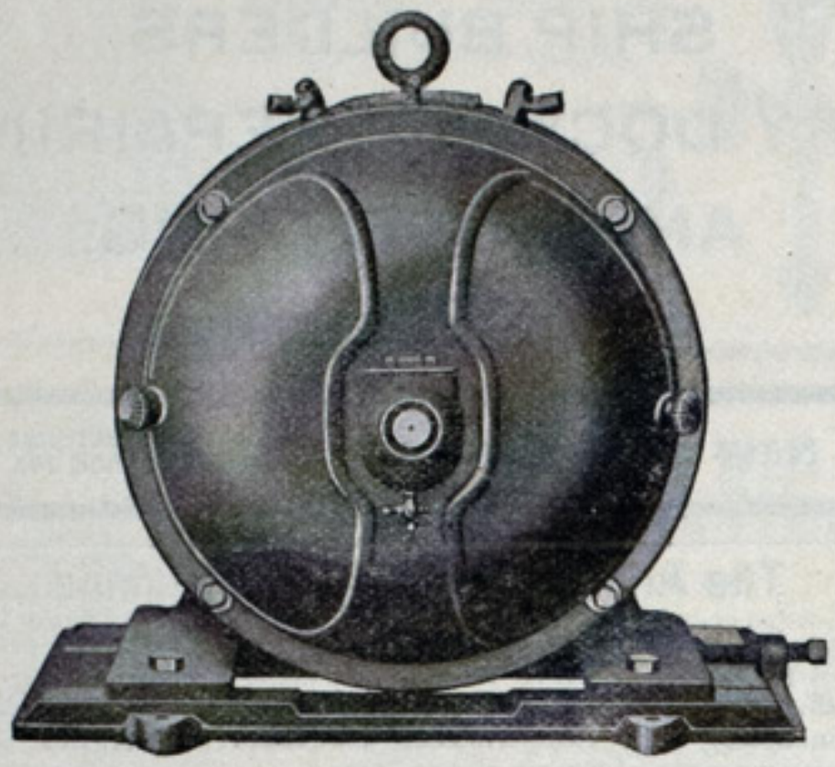

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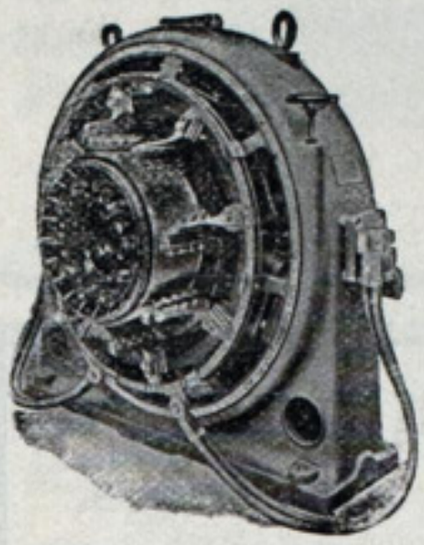

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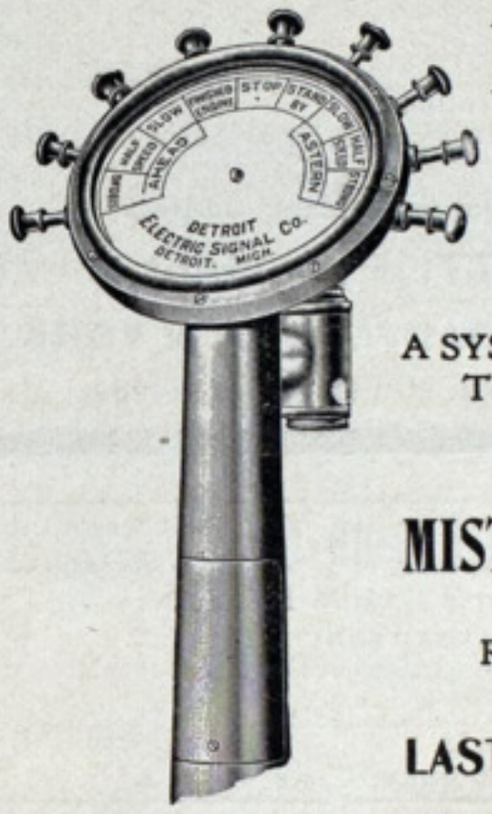

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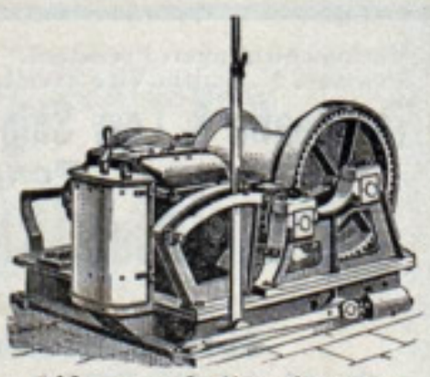

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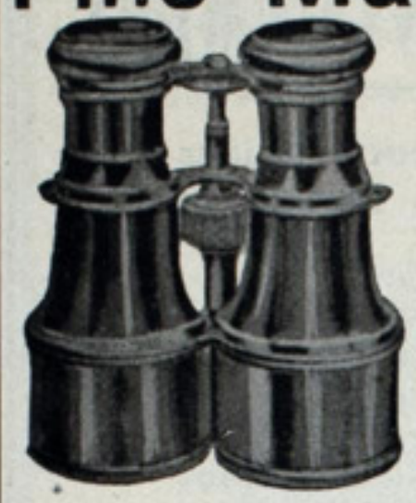

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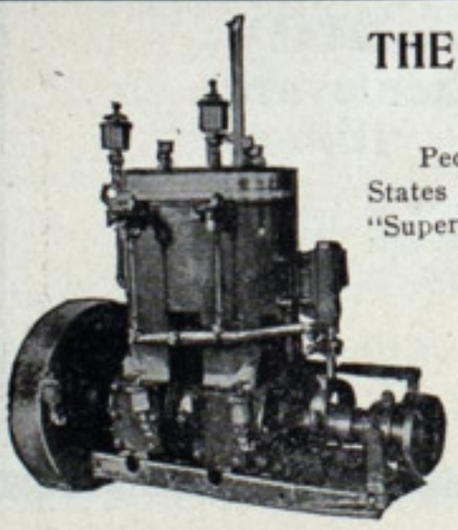

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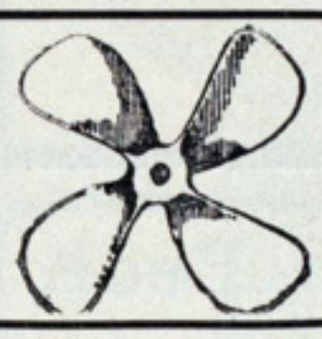

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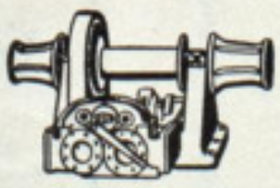

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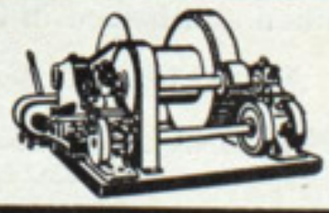

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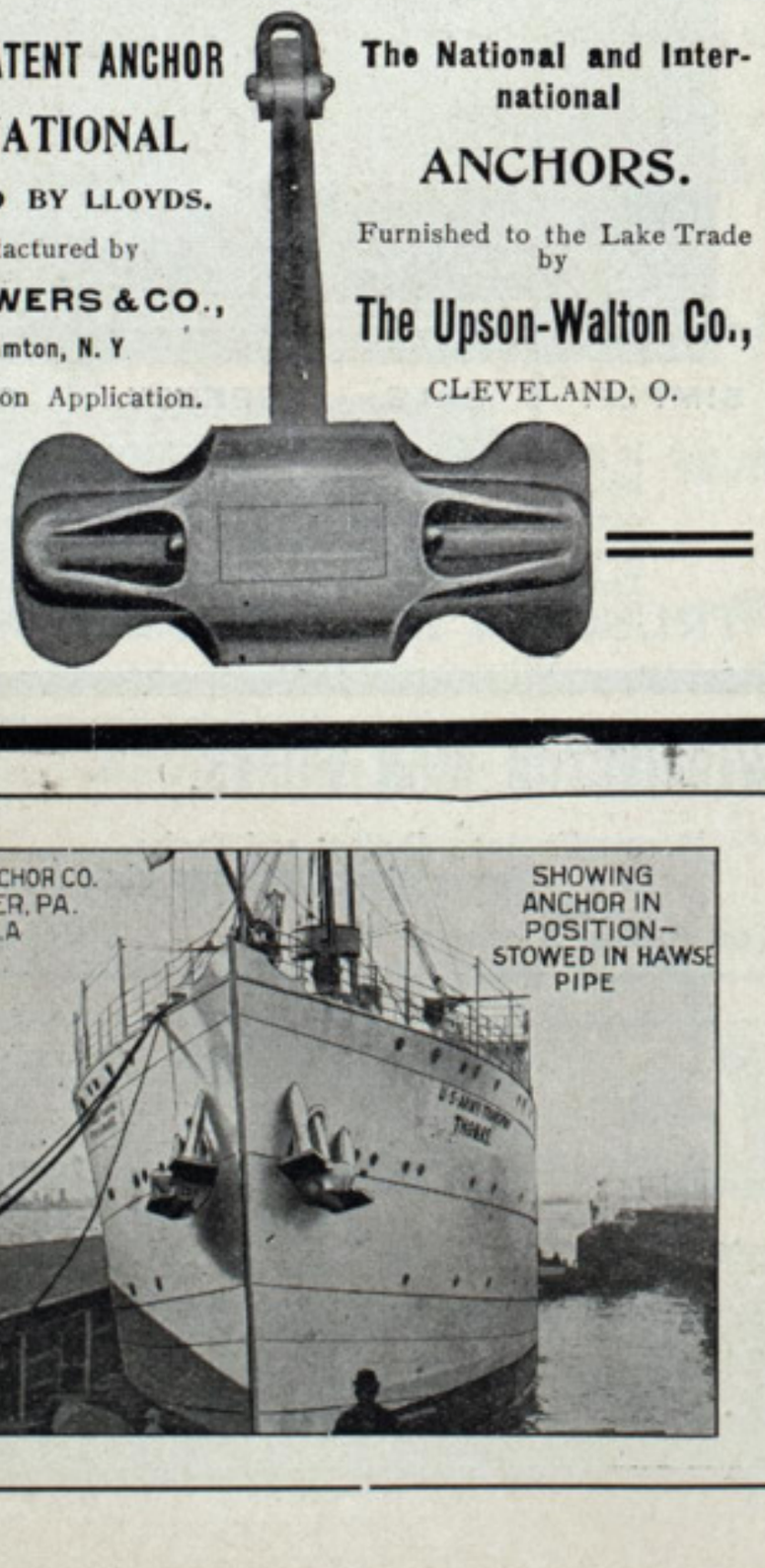

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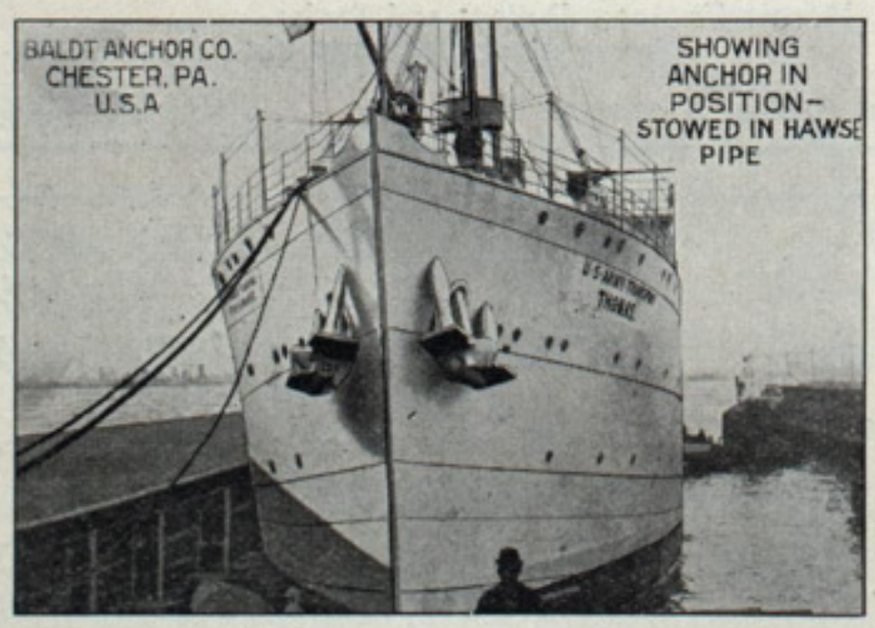

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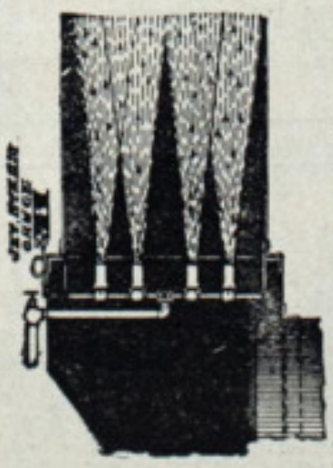

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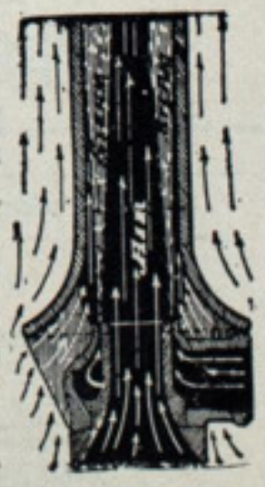

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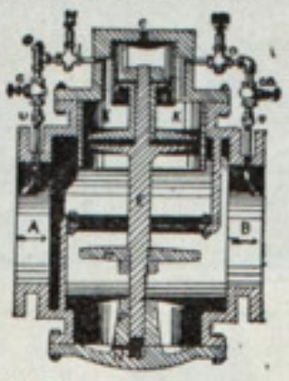

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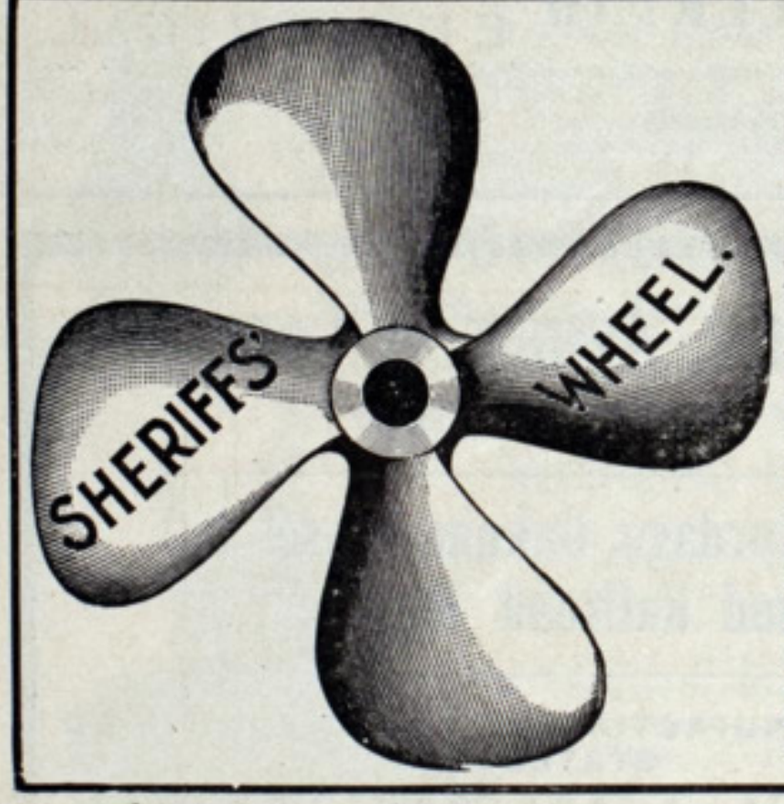

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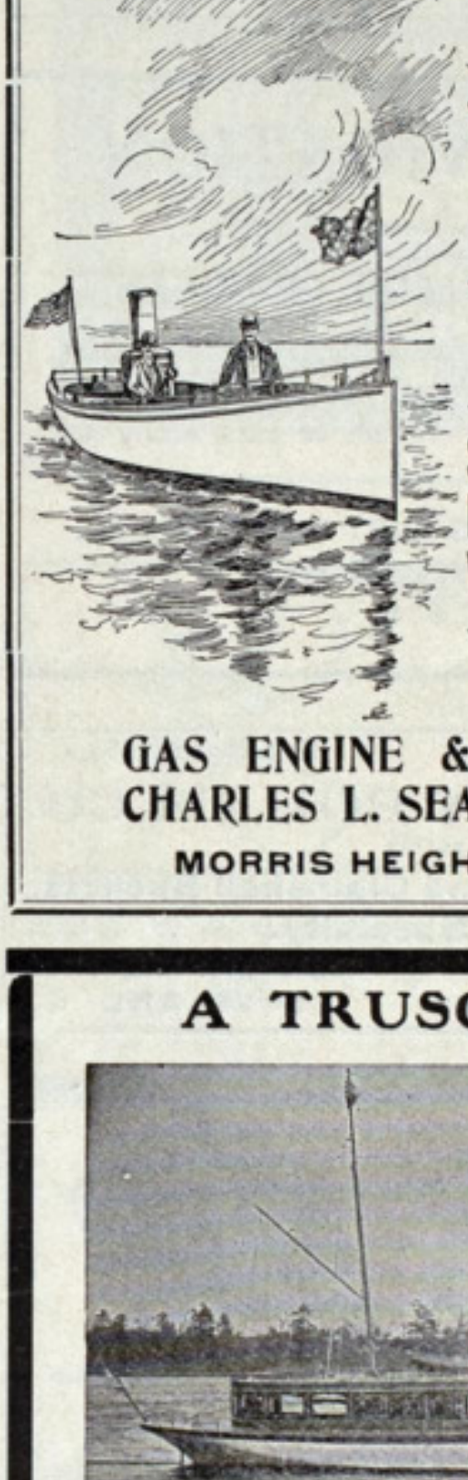

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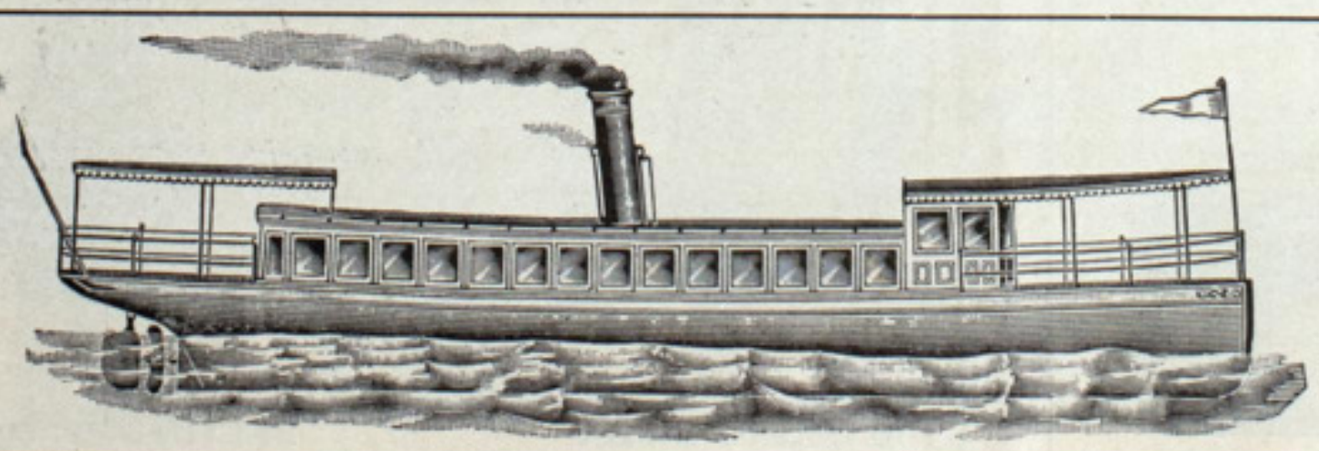

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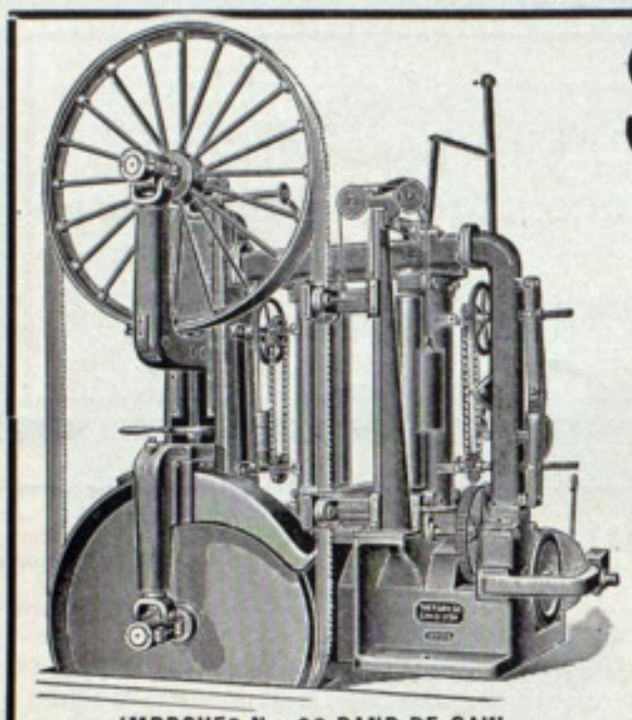

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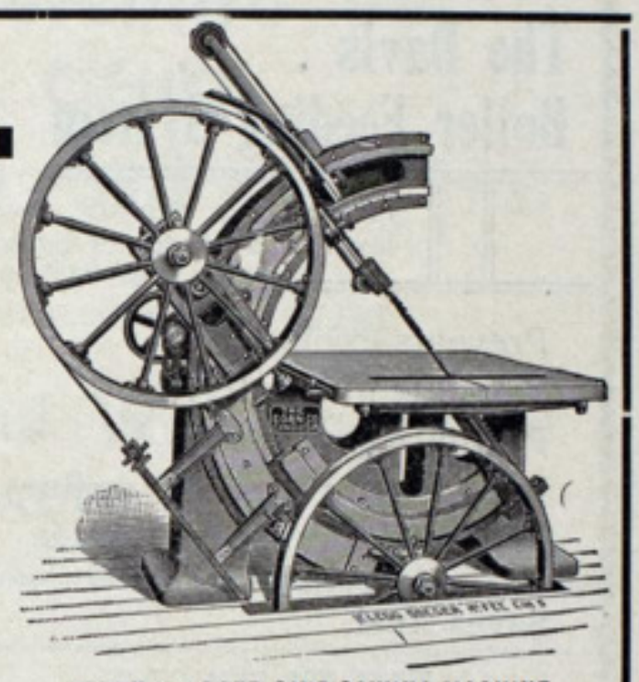

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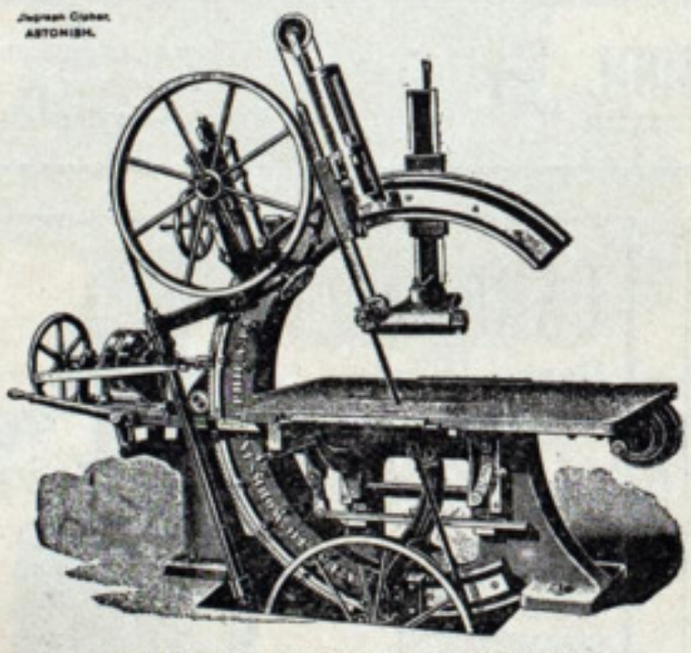

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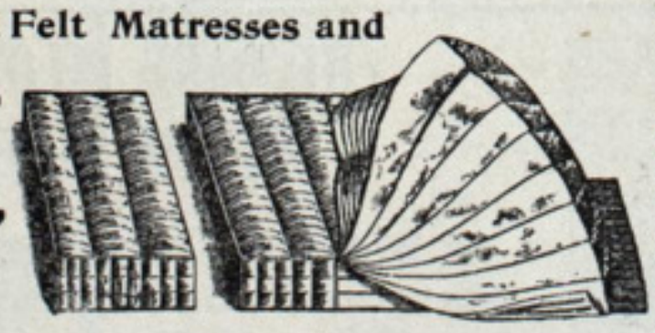

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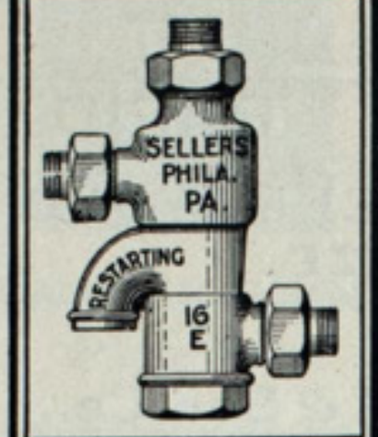

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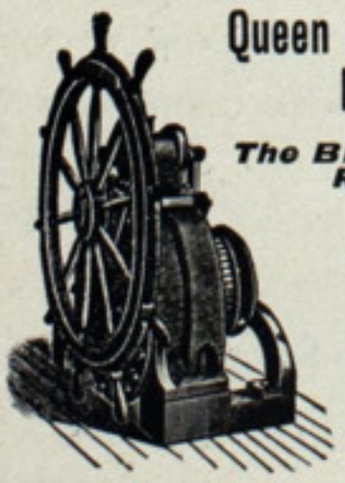

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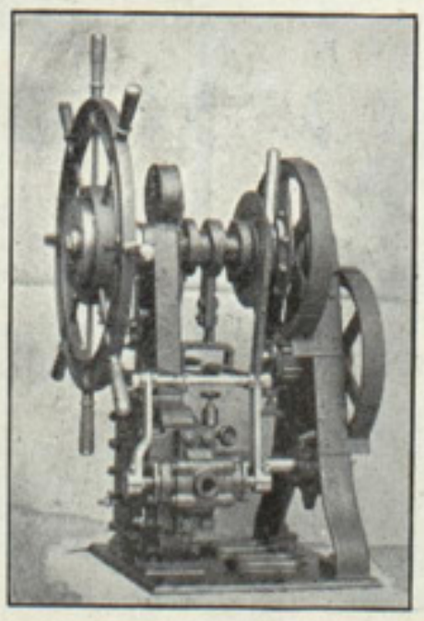

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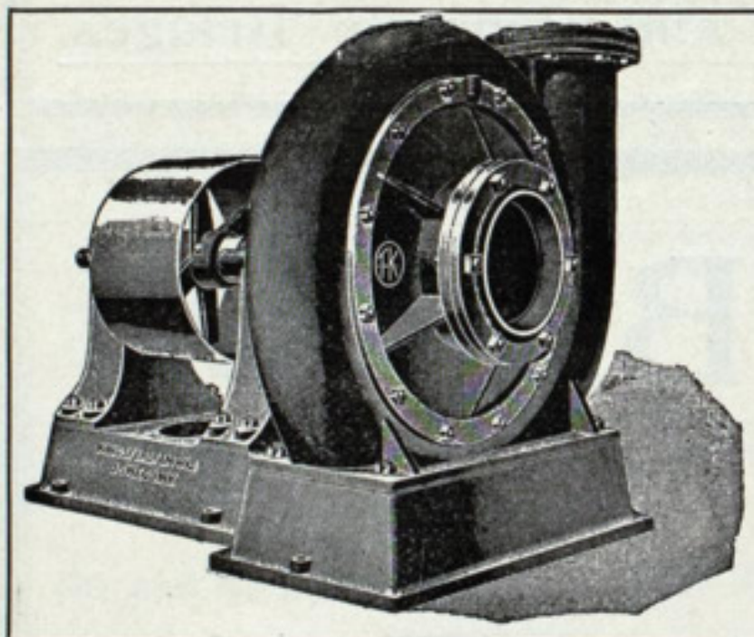

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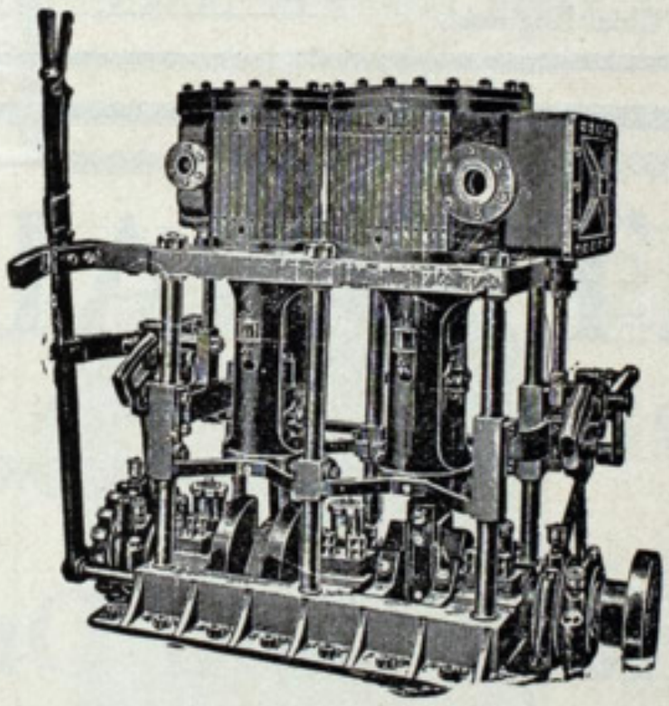

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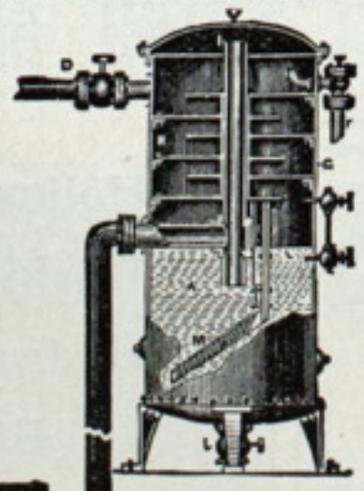

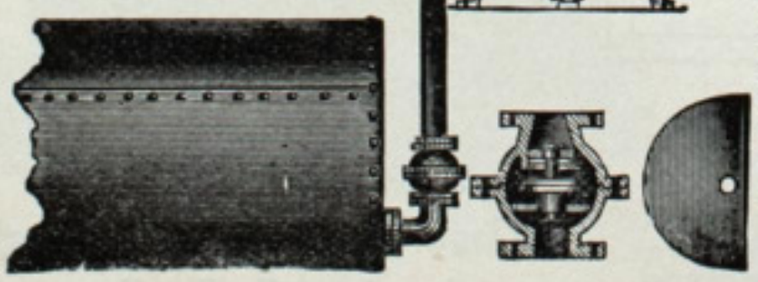

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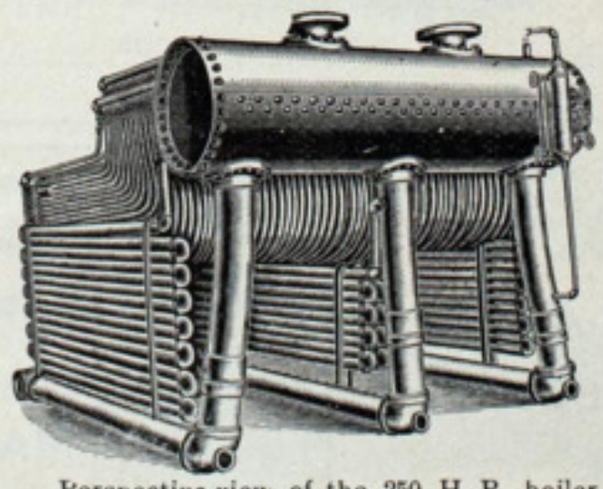

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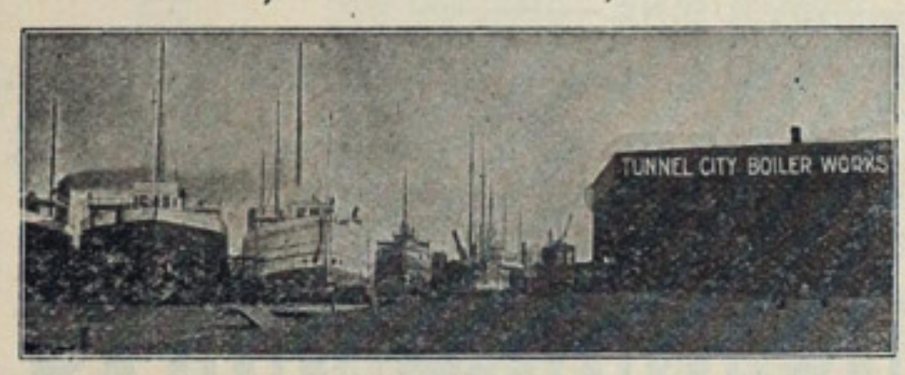

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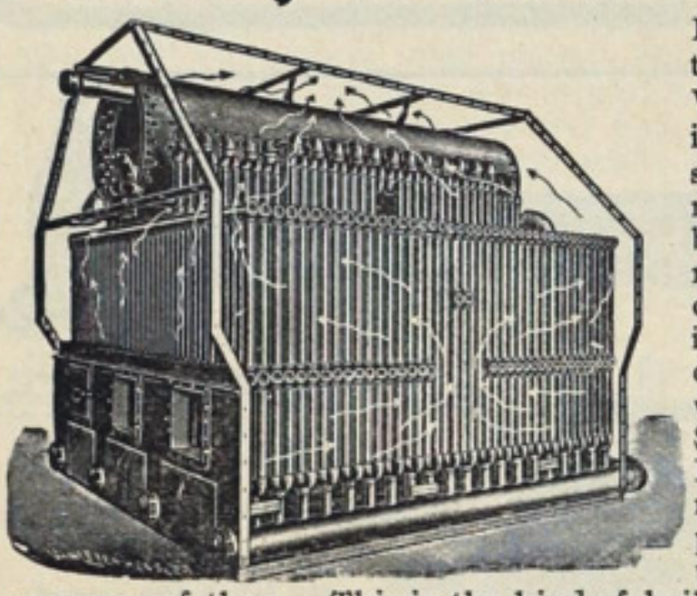

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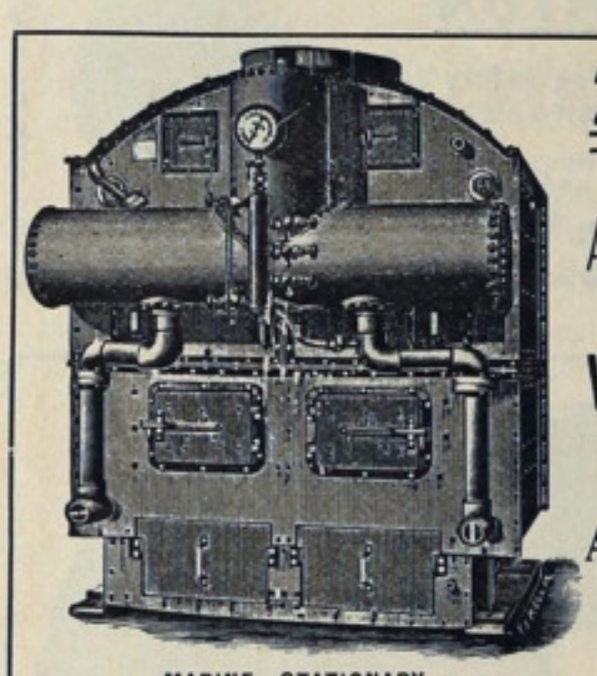

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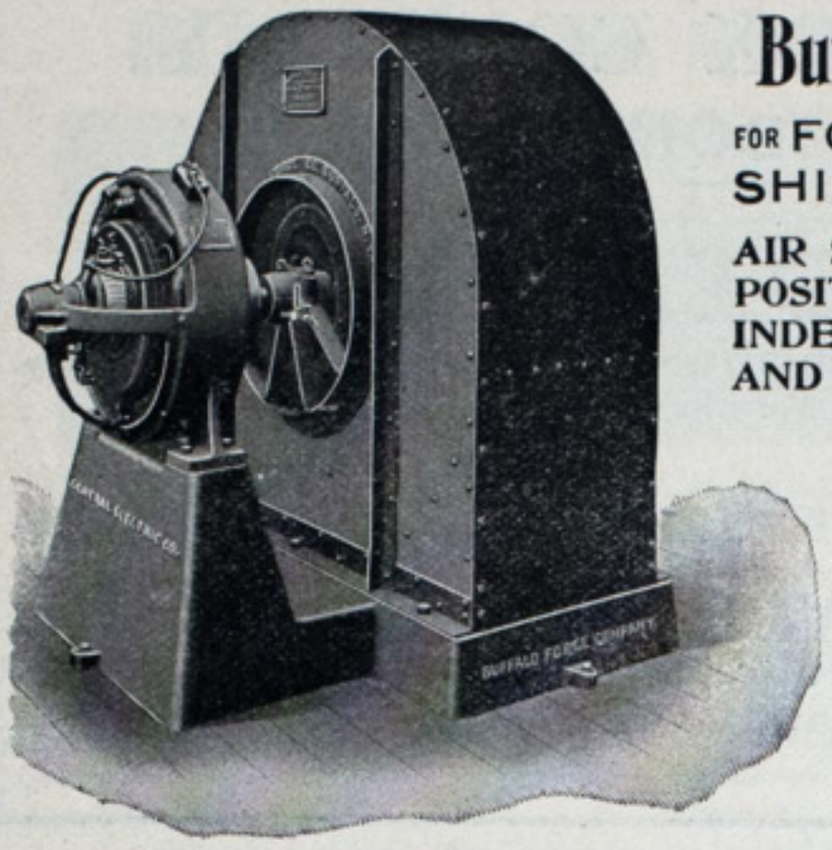

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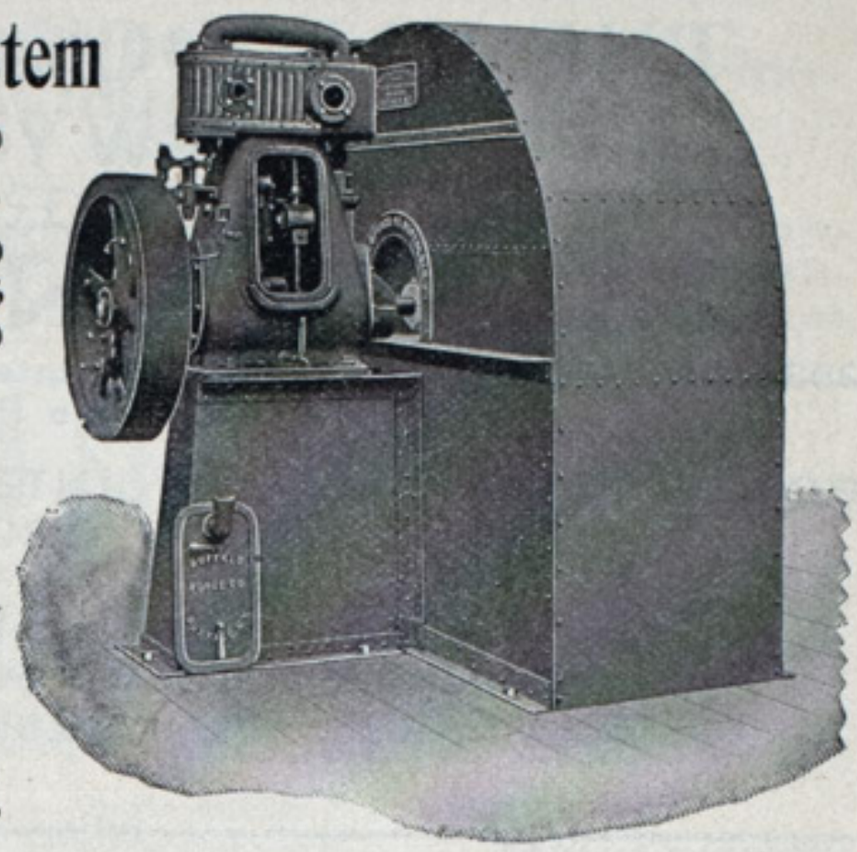

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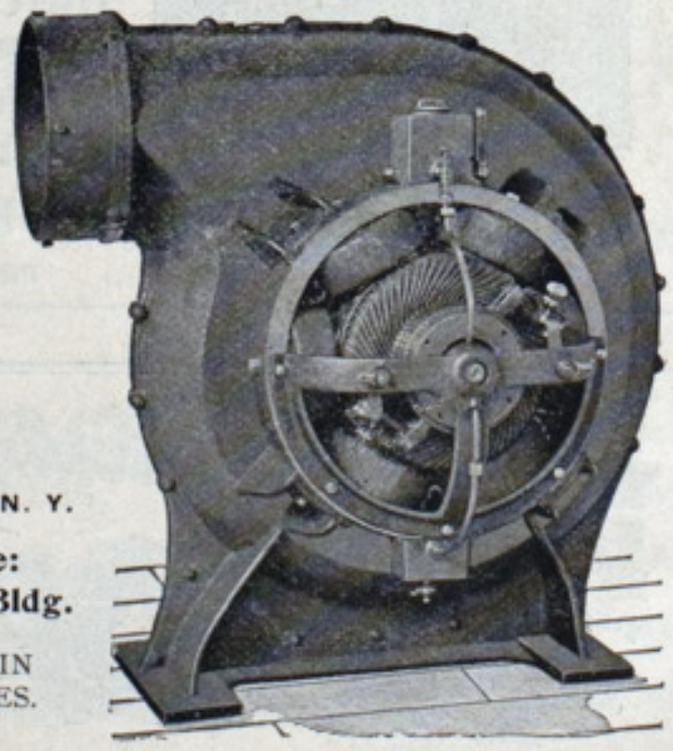

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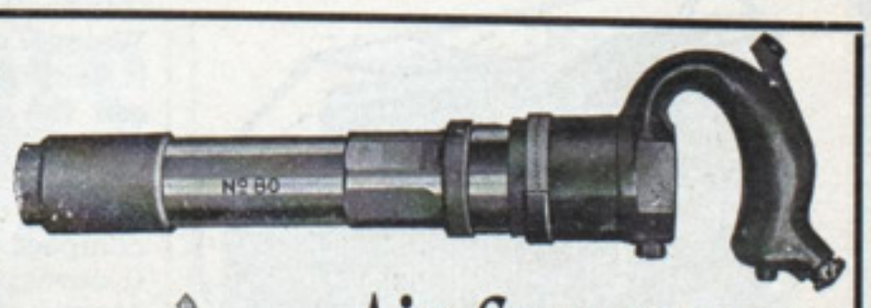

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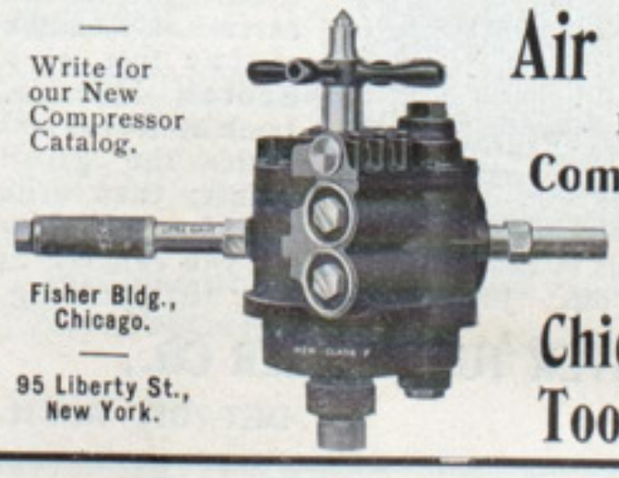

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